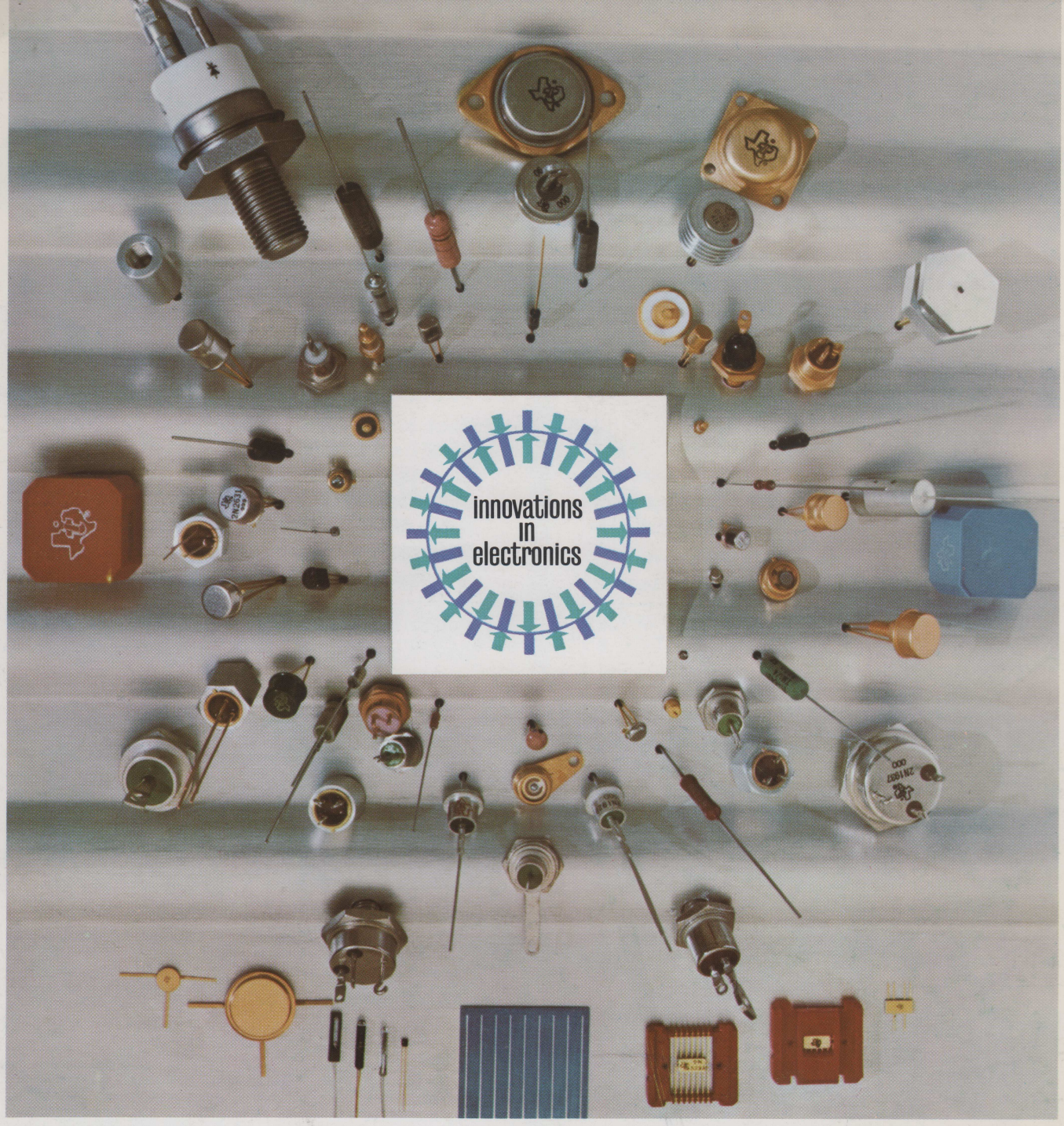


TEXAS INSTRUMENTS
INCORPORATED

SEMICONDUCTOR AND COMPONENTS **CATALOG** AUGUST, **1965**

contents

NEW PRODUCTS 1-5

SEMICONDUCTOR INTEGRATED CIRCUITS

- Series 54 and 74 TTL Digital 6
- Series 53 and 73 Modified-DTL Digital 6
- Series 70 ECL Digital 6
- Series 51 and 51R RCTL Digital 7
- Series 1500 and 1580 DTL Digital 7
- Series 1700 RTL Digital 7
- Series 52 Operational/Differential Amplifiers 8
- Series 55 High-frequency Amplifiers 8
- Minuteman Series DTL Digital/Linear/Memory 9
- Special Amplifiers 9

SILICON TRANSISTORS 10-15

GERMANIUM TRANSISTORS 16-19

DIODES AND RECTIFIERS 20-29

- Silicon Computer Diodes 20, 21
- General Purpose Silicon Diodes 21
- Silicon Radiation-Tolerant Diodes 22
- Silicon Power Regulators 22, 23
- Silicon Voltage Regulator Diodes 23-25
- Gallium Arsenide Varactor Diodes 26
- Silicon Voltage-Variable-Capacitance Diodes 26
- Silicon Controlled Rectifiers 27
- SCR Trigger Diodes 27
- Silicon Rectifiers 28, 29

OPTOELECTRONIC DEVICES

- Silicon Planar and Planar Epitaxial Sensors 30
- Silicon Planar Light-activated Switch 30
- Silicon Photovoltaic Light Sensor 30
- Silicon Photo Devices 30
- Gallium Arsenide Infrared Sources 31
- Optoelectronic Choppers and Switches 31
- NP Silicon Planar Epitaxial Communication Detector 31

SPECIAL PRODUCTS

- Silicon Grown Unijunction Transistors 32
- Silicon Darlington Transistors (NPN) 32
- Silicon Dual Transistors 32
- Silicon Field-effect Transistors 33
- Silicon Dual Field-effect Transistors 33
- Silicon Field-effect Choppers 33
- Silicon Choppers 33
- Silicon Double-emitter Choppers 34
- Silicon Avalanche Switches 34
- Silicon Miniature Transistors 34
- Transistors for Consumer Circuit Applications 35

RESISTORS 36

CAPACITORS 37

CASE OUTLINE DRAWINGS 38-42

INDEX TO DEVICE NUMBERS 43

COVER — From production of the first silicon transistor to today's most advanced integrated circuits, TI's innovations have brought many technological advances to the electronics industry. The symbol "Innovations in Electronics" represents TI's commitment to continue creating, making and marketing the broadest line of quality products to meet your design needs.

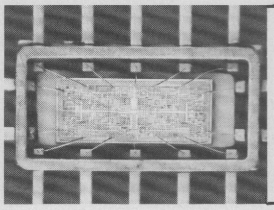
NEW PRODUCTS FROM TI

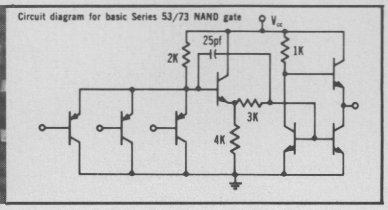
New – THREE INDUSTRIAL INTEGRATED CIRCUIT DIGITAL FAMILIES

- Low cost-per-circuit-function
- Multi-function approach to system economy
- 0° to 70° operating temperature range
- Standard ¼″ by ⅛″ flat pack
- Optional plug-in flat pack at right

SERIES 73 – MODIFIED DTL

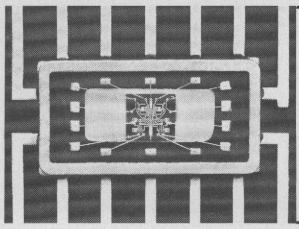
- General-purpose digital applications
- Most economical TI integrated-circuit line
- Extensive use of multi-function design

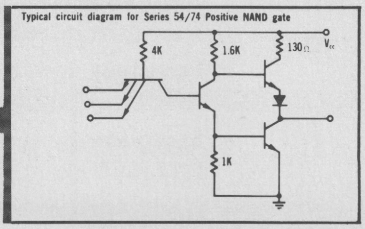




SERIES 74 – TTL

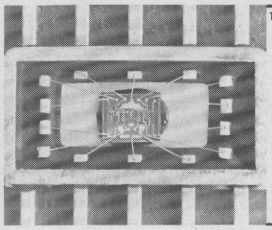
- High-performance applications
  - High speed (saturated) — 13 nsec
  - High noise margin — 1 v
  - High fan-out — 10
- Multi-function economies

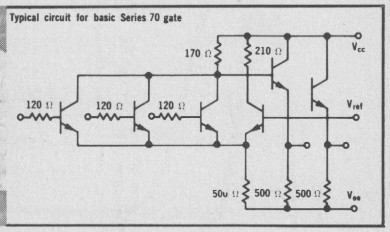




SERIES 70 – ECL

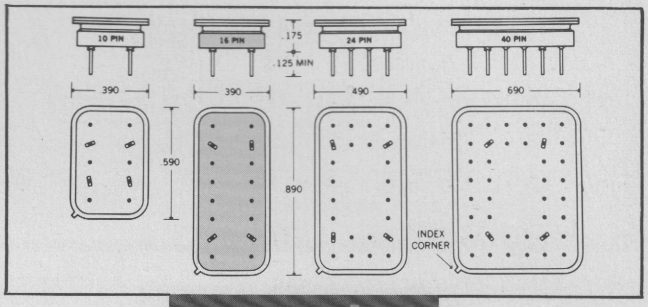
- Very high speed unsaturated logic — 5 nsec
- OR/NOR logic flexibility
- Dual-gate economies
- For large-computer applications

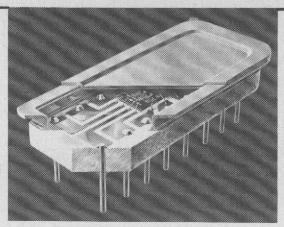




New – INDUSTRIAL PLUG-IN FLAT PACKS

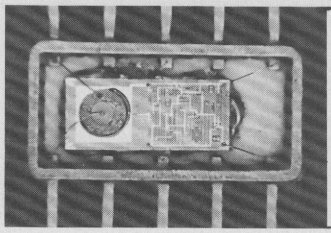
- Plug-in configuration for economical flow-soldering techniques
- Sturdy pins for ease of insertion — automatic or manual
- Pins on 100-mil grid spacings
- Hermetic seals for full 0° to 70°C operation
- Modular design of package family to accommodate future large logic arrays
- Now available — 16-pin package with two rows of pins 200 mils apart

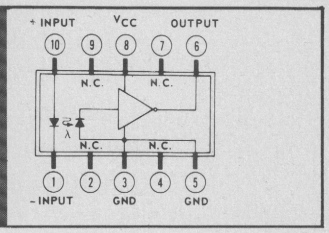




New – SNX1304 OPTOELECTRONIC PULSE AMPLIFIER

- GaAs light emitter optically coupled to an integrated-circuit feedback amplifier
- Input-to-output voltage isolation — ±100 v
- Broad-band pulse transformer — dc to 100 kc
- Forward input current — 15 ma
- Fan-out compatible with Series 51 integrated circuits



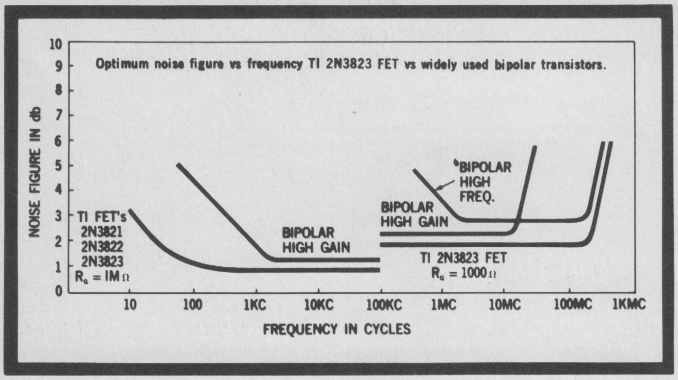


NEW PRODUCTS FROM

10 CPS–500 MC LOW-NOISE N-CHANNEL FIELD EFFECT TRANSISTOR

2N3823
TO-72

- Low noise: 1.5 db at 100 mc, 4.5 db at 500 mc
- Low cross modulation: < 1% for a 1 mv signal at 200 mc and a 200 mv signal at 150 mc
- High transconductance: 4800 μmhos typical
- Low C_{rss}: 2 pf max



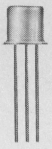
N-CHANNEL SILICON FIELD EFFECT TRANSISTOR For Chopper and Multiplex Applications

TIXS33
TO-72

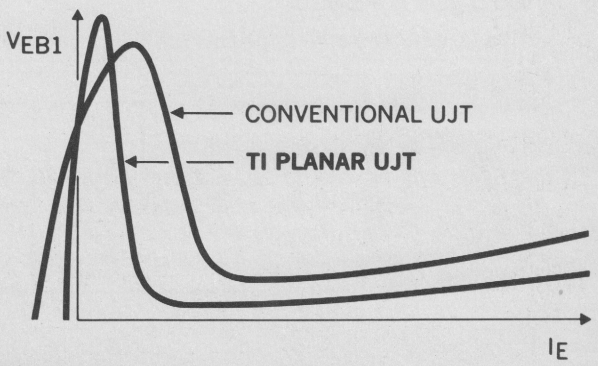
- Low R_{DSON}: 60 ohms max
- High transconductance: Y_{fs} > 12,000 umhos
- High drain current: I_{DSS} > 25 ma
- Low leakage current: I_{GSS} < 1 na
- Low drain-gate capacitance: C_{DG} < 5 pf
- Low input capacitance: C_{ISS} < 20 pf
- Symmetrical geometry, planar-epitaxial construction

PLANAR UNIJUNCTION TRANSISTOR

2N3980
TO-18



- High maximum frequency of oscillation: 1 mc guaranteed
- Extremely low leakage: I_{E-B2O} = 2 na at 30 volts
- Exceptionally low valley current: I_V:1 to 10 ma
- High performance capability at low driving currents
- Broad application: wider usage than conventional UJT
- Planar performance and reliability



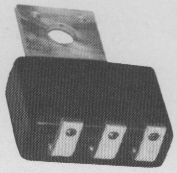
TEXAS INSTRUMENTS

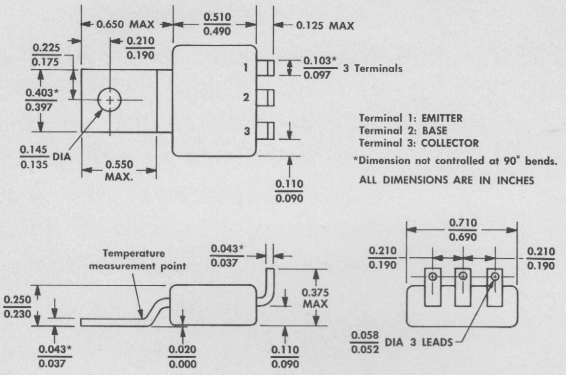
HIGH-POWER PLASTIC-ENCAPSULATED NPN PLANAR SILICON TRANSISTOR

- Extremely low saturation voltage: $V_{CE(SAT)}$ = 0.1 volt typical at I_C = 200 ma.
- High power dissipation: 15 watts at 25°C case
- High gain: Typical h_{FE} = 40 at I_C = 200 ma
- High current capability with h_{FE} linearity: h_{FE} = 35 typical at 50 ma, 30 typical at 1 amp

IDEAL FOR COST-CRITICAL APPLICATIONS

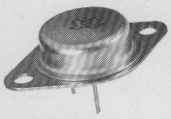
TIP14
TAB-PAC* PACKAGE





400-VOLT NPN MESA SILICON POWER TRANSISTOR

TIP04
TO-3

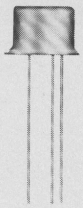


- High voltage: $V_{(BR)CEO}$ = 300 volts min
  $V_{(BR)CBO}$ = 400 volts min
- Low saturation voltage: 1 volt max at I_C = 2 amps
- Low leakage: I_{CEX} = 10 ma max at V_{CE} = 400 volts, T_A = 100°C
- Gain: h_{FE} = 10 min at I_C = 2 amps
- Frequency: f_T = 3 mc min

IDEAL FOR HIGH-VOLTAGE SWITCHING APPLICATIONS

1-AMP PLANAR EPITAXIAL NPN SILICON POWER TRANSISTOR

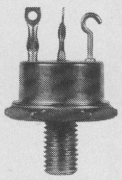
2N4000-01
TO-5



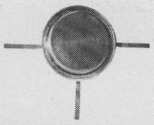
- High voltage: $V_{(BR)CEO}$ = 120 volts typical
- Extremely low $V_{CE(SAT)}$: 0.25 volts typical at I_C = 1.0 amp
- Linear h_{FE} over wide current range: 40 typical at I_C = 50 ma, 45 typical at 1 amp
- Fast switching: t_{on} = 200 nsec, t_{off} = 700 nsec typical at 500 ma

50-AMP PLANAR EPITAXIAL NPN SILICON POWER TRANSISTORS

2N4002-03
TO-63

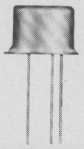


2N4004-05
THIN PAC* Package



- High power dissipation: 100 watts (TO-63), 40 watts (Thin-Pac) at 100°C Case
- High voltage: $V_{(BR)CEO}$ = 100 volts typical
- Extremely low $V_{CE(SAT)}$ = 0.8 volts typical at 30 amps
- Fast switching: t_{on} = 400 nsec typical, t_{off} = 800 nsec typical at 20 amps
- High current capability: h_{FE} = 25 typical at 30 amps

5-AMP PLANAR EPITAXIAL NPN SILICON POWER TRANSISTORS



2N3418-21
TO-5

2N3898-99
Standard Stud

2N3996-97
Isolated Stud

- High power dissipation: 30 watts (stud), 10 watts (TO-5) at 100°C case
- High voltage: $V_{(BR)CEO}$ = 100 volts typical
- Extremely low $V_{CE(SAT)}$: 0.5 volts typical at 5 amps
- Fast switching: t_{on} = 200 nsec typical, t_{off} = 800 nsec typical at 1 amp
- Very high gain: h_{FE} = 150 typical at 1 amp (2N3997 and 2N3999)

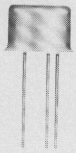
*Trademark of Texas Instruments Incorporated

NEW PRODUCTS FROM

GERMANIUM EPITAXIAL MESA WIDEBAND LINEAR AMPLIFIER

2N3995

TO-39



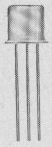
IDEAL FOR COMMUNICATIONS APPLICATIONS REQUIRING LOW INTERMODULATION DISTORTION

- Low intermodulation distortion: –70 db
- Low noise: NF = 5 db at 30 mc
- Flat $|h_{fe}|$: $\triangle h_{fe} < 2$ db at 30 mc over a 6:1 current range
- Power dissipation 750 mw at 25°C case

GERMANIUM GENERAL PURPOSE RF AMPLIFIER

2N2273

TO-18



- High frequency: $|h_{fe}| = 20$ db min, 28 db max at 10 mc; $f_T = 250$ mc min
- Narrow beta range: h_{fe} 3.75:1 (20 min, 75 max)
- Hermetically sealed TO-18 package

FOR MILITARY TRANSCIEVER APPLICATIONS

GERMANIUM WIDEBAND LINEAR AMPLIFIER

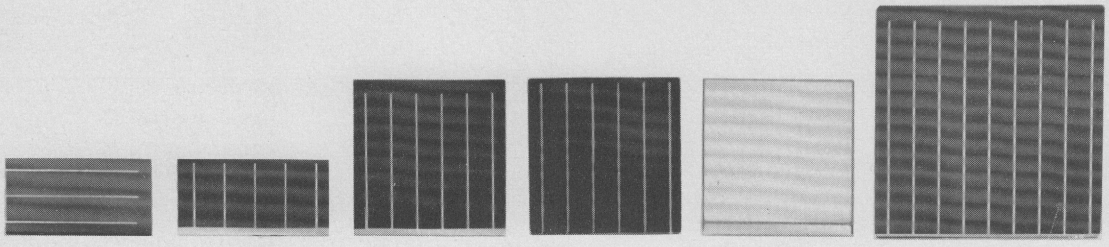
2N3371

TO-18

- Exceptionally low noise: NF = 3 db max at 30 mc
- High RF gain: $|h_{fe}| = 30$ db min at 10 mc
- High linearity: $\triangle |h_{fe}|$ guaranteed 3 db max from 4 ma to 10 ma I_C
- Power dissipation: 150 mw at 25°C free air
- Hermetically sealed TO-18 case

FOR APPLICATIONS REQUIRING WIDE DYNAMIC RANGE LINEAR OPERATION

N-ON-P SILICON SOLAR CELLS FOR HIGH-RELIABILITY SPACE APPLICATIONS

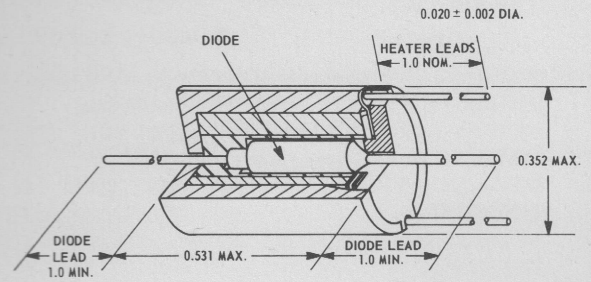


1x2 cm 3 Grid | **1x2 cm 5 Grid** | **2x2 cm 6 Grid** | **2x2 cm 6 Grid Wrap Around** | **3x3 cm 9 Grid**

- High radiation resistance
- High efficiency: up to 13% AM1
- Light weight: 0.17 gram for 1x2 cm solderless 3 grid cell
- Titanium-silver sintered contacts

TEXAS INSTRUMENTS

TEMPERATURE COMPENSATED REFERENCE DIODES



TIXD746-TIXD759

Your broadest choice of temperature compensated diodes

- Greatly improved stability: typically 15:1 TC rating improvement
- Broad voltage selection: 14 ratings available off-the-shelf from 3.3 to 12 volts
- Maximum TC ratings: .005%/°C from –55°C to 100°C; .003/°C from 0°C to 75°C
- AC or DC operation at 24 volts
- Self regulating for greater stability over wide current range

PLANAR EPITAXIAL GALLIUM ARSENIDE SCHOTTKY BARRIER VARACTOR DIODE

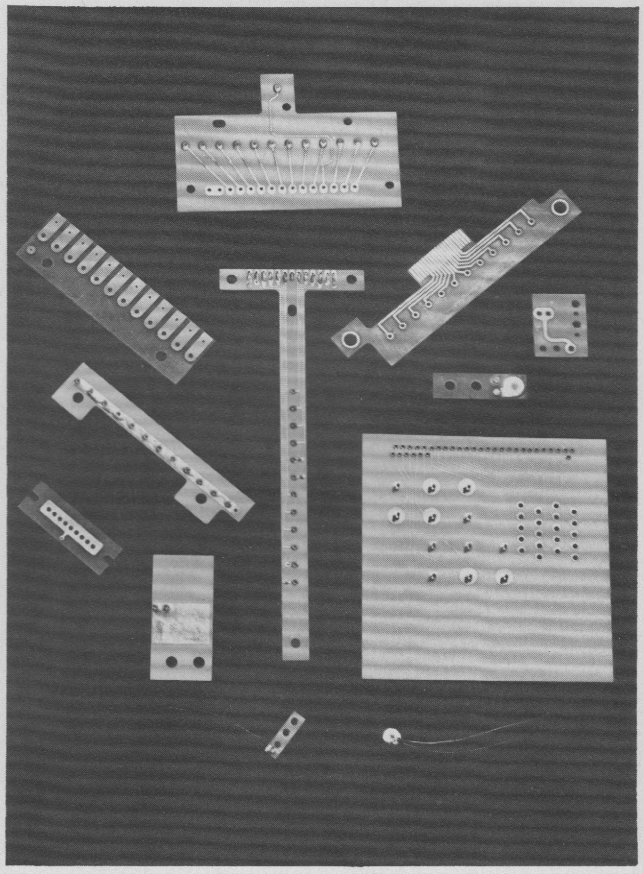
TIXV05-07
MICROWAVE PACKAGE

- High frequency: f_{co} = 500 Gc min @ V_R = 2 volts
- Low noise: N.F. = 3 db at 16.5 Gc
- High tuneability: 2-to-1 improvement over conventional varactor diodes
- Increased efficiency: pump power reduced by a factor of 10

CUSTOMIZED SOLID-STATE LIGHT-SENSOR ARRAYS

Preassembled and tested PC boards for your tape reader, card reader, and character recognition applications

- Advanced silicon sensors and gallium arsenide light emitters
- Solid-state reliability, hermetically sealed units
- Array design flexibility to meet your special needs
- Sensitivity matching to within ±20%
- Significant cost and space savings



Series 54 and 74 TTL Digital

- High-speed saturated logic, low power dissipation
- High noise margin, high fan-out
- Standard TO-84 flat package (optional plug-in package for Series 74)

TYPICAL CHARACTERISTICS

Parameter	Basic Gate	Flip-flop
Propagation delay	13 nsec	40 nsec
Power dissipation	10 mw	60 mw
Fan-out	10	10
D-c noise margin	1 v	1 v
Supply voltage		
Series 54	4.5 to 5.5 v	4.5 to 5.5 v
Series 74	4.75 to 5.25 v	4.75 to 5.25 v
Temperature range		
Series 54	–55° to +125°C	–55° to +125°C
Series 74	0° to +70°C	0° to +70°C

SN5400/SN7400 — Quadruple 2-input Positive NAND Gate
SN5410/SN7410 — Triple 3-input Positive NAND Gate
SN5420/SN7420 — Dual 4-input Positive NAND Gate
SN5430/SN7430 — 8-input Positive NAND Gate
SN5440/SN7440 — Dual 4-input Positive NAND "Power" Gate
SN5450/SN7450 — Dual EXCLUSIVE-OR Gate with Expander Inputs
SN5460/SN7460 — Dual 4-input Expander
SN5470/SN7470 — Single-phase J-K Flip-flop

Series 53 and 73 Modified-DTL Digital

- Multiple circuit functions per package
- Full saturated NAND/NOR logic flexibility
- Standard TO-84 and TO-89 flat package (optional plug-in package for Series 73)

TYPICAL CHARACTERISTICS

Parameter	Basic AND Gate	Basic NAND Gate	Flip-flop
Propagation delay	5 nsec	30 nsec	60 nsec
Power dissipation	10 mw	10 mw	27 mw
D-c noise margin	300 mv	300 mv	300 mv
Fan-out	4	10	10
Supply voltage	3 to 4 v	3 to 4 v	3 to 4 v
Temperature range			
Series 53	–55° to +125°C	–55° to +125°C	–55° to +125°C
Series 73	——	0° to +70°C	0° to +70°C

SN530/SN7300 — Single-phase J-K Flip-flop with Preset
SN5301/SN7301 — J-K Flip-flop with Preset and Clear
SN5302/SN7302 — Dual J-K Flip-flop with Preset
SN5304/SN7304 — Dual J-K Flip-flop with Preset and Clear
SN531/SN7310 — 5-input Expandable NAND/NOR Gate
SN5311/SN7311 — Dual 5-input NAND/NOR Gate
SN532/SN7320 — 5-input AND/OR Gate or Expander*
SN533/SN7330 — Dual 3-input NAND/NOR Gate
SN5331/SN7331 — Triple 3-input NAND/NOR Gate
SN534 — Dual AND/OR Gate (2 and 3 Inputs)
SN535/SN7350 — Quadruple Inverter/Driver
SN5360/SN7360 — Quadruple 2-input NAND/NOR Gate
SN5370/SN7370 — Dual EXCLUSIVE-OR Gate
SN5380/SN7380 — "One Shot" Monostable Multivibrator

*SN7320 is Expander only.

Series 70 ECL Digital

- Very high-speed unsaturated logic
- High degree of logic flexibility
- Standard TO-84 welded flat pack or optional plug-in flat pack

TYPICAL CHARACTERISTICS

Parameter	Basic Gate
Propagation delay	5 nsec
Power dissipation	40 mw+
Noise immunity	250 mv
Supply voltage	+1.25 v, –3.5 v
Temperature range	0° to +70°C

SN7000 — Dual OR/NOR Gate (4 Output Resistors)
SN7001 — Dual OR/NOR Gate (2 Output Resistors)

Series 51 and 51R† RCTL Digital

- Very low power dissipation, high fan-out
- Proved reliability
- Standard TO-84 and TO-89 welded flat packages

TYPICAL CHARACTERISTICS

Parameter	Basic Gate	Flip-flop
Propagation delay	130 nsec @ 3 v 65 nsec @ 6 v	300 nsec
Power dissipation	2 mw @ 3 v	2 mw @ 3 v
Fan-out	5, 25*	4, 20*
D-c noise margin	200 mv	200 mv
Supply voltage	3 to 6 v	3 to 6 v
Temperature range	−55 to +125°C	−55 to +125°C

*with emitter-follower outputs

† Series 51R networks are standard Series 51 units that have undergone special testing and processing for severe-environment applications.

SN510A/SNR510 — R-S Flip-flop/Counter
SN5101/SNR5101 — R-S Flip-flop with Dual Preset
SN511A/SNR511 — R-S Flip-flop/Counter with Emitter-follower Outputs
SN5111/SNR5111 — R-S Flip-flop with Emitter-follower Outputs and Dual Preset
SN5112/SNR5112 — Ripple-counter Flip-flop (V_{CC} = 3 to 6 v)
SN5113/SNR5113 — Ripple-counter Flip-flop (V_{CC} = 4 to 6 v)
SN512A/SNR512 — 6-input NAND/NOR Gate
SN513A/SNR513 — 6-input NAND/NOR Gate with Emitter-follower Output
SN514A/SNR514 — Dual 3-input NAND/NOR Gate
SN515A/SNR515 — EXCLUSIVE-OR Gate
SN516A/SNR516 — Dual 2-input NAND/NOR Gate and Inverter/Buffer
SN5161/SNR5161 — Triple 2-input NAND/NOR Gate
SN5162/SNR5162 — Triple 2-input NAND/NOR Gate with Emitter-follower Output
SN517A/SNR517 — Clock Driver
SN518A/SNR518 — "One Shot" Monostable Multivibrator
SN5191/SNR5191 — Pulse EXCLUSIVE-OR Gate

Series 1500 and 1580 DTL Digital

- High speed, low power dissipation
- High noise immunity
- Standard TO-84 welded flat package (Optional plug-in package for Series 1580)

TYPICAL CHARACTERISTICS

Parameter	Basic Gate	Flip-flop
Propagation delay	25 nsec	50 nsec
Power dissipation	5 mw	20 mw
Fan-out	8	7
D-c noise margin	750 mv	750 mv
Supply voltage	4.5 to 5.5 v	4.5 to 5.5 v
Temperature range		
Series 1500	−55° to +125°C	−55° to +125°C
Series 1580	0° to +70°C	0° to +70°C

SN1500/SN1580 — Dual 4-input Expander
SN1501/SN1581 — Dual 4-input Expandable NAND Gate
SN1502/SN1582 — Dual 4-input Expandable Buffer
SN1503/SN1583 — Quadruple 2-input NAND Gate
SN1504/SN1584 — Dual 4-input Expandable NAND Power Gate
SN1510/SN1590 — J-K/R-S Flip-flop
SN1511/SN1591 — High-performance J-K/R-S Flip-flop
SN1513/SN1593 — Fast-rise-time J-K/R-S Flip-flop

Series 1700 RTL Digital

- Low power dissipation with moderate speed capability
- Choice of TO-89 flat package or TO-78 (modified TO-5)
- Simple RTL logic configuration

TYPICAL CHARACTERISTICS

Parameter	Basic Gate	Register
Propagation delay	35 nsec	70 nsec
Power dissipation	4 mw	15 mw
D-c noise margin	150 mv	150 mv
Fan-out	4	3
Supply voltage	3 v	3 v
Temperature range	−55 to +125°C	−55 to +125°C

SN1729/SN1729A — Adder
SN1730/SN1730A — Buffer
SN1731/SN1731A — Dual 2-input Gate
SN1732/SN1732A — Dual 2-input Expander Gate
SN1732/SN1732A — Dual 2-input Expander Gate
SN1733/SN1733A — 4-input Gate
SN1734/SN1734A — Half-adder
SN1735/SN1735A — Register

NOTE: "A" after type number indicates TO-84 flat package; No suffix indicates modified TO-5.

Series 52 Operational / Differential Amplifiers

- Very low input and output offset characteristics
- High common-mode input capability
- Standard TO-84 and TO-89 flat packages

SN521A

Operational Amplifier

TYPICAL CHARACTERISTICS

Voltage gain	1200
Input impedance	12 k Ω
Output impedance	10 k Ω
D-c drift referred to input	8 μv/°C
Output signal swing	±4.7 v
Common-mode rejection	60 db
Temperature range	−55° to +125°C

SN522A

Operational Amplifier

TYPICAL CHARACTERISTICS

Voltage gain	1200
Input impedance	12 k Ω
Output impedance	160 Ω
D-c drift referred to input	8 μv/°C
Output signal swing	±3.7 v
Common-mode rejection	60 db
Temperature range	−55° to +125°C

SN523A

General-purpose Differential Amplifier

TYPICAL CHARACTERISTICS

Voltage gain (differential)	2500
Input impedance	10 k Ω
Input offset voltage	2 mv
D-c drift referred to input	5 μv/°C
Output signal swing, single-ended	±6.5 v
Common-mode rejection	90 db
Temperature range	−55° to +125°C

SN524A

General-purpose Operational Amplifier

TYPICAL CHARACTERISTICS

Voltage gain	1200
Input impedance	1 megohm
Input offset voltage	12 mv
D-c drift referred to input	20 μv/°C
Output signal swing, single ended	±7.5 v
Common-mode rejection	55 db
Temperature range	−55° to +125°C

SN525A

High-performance Differential Amplifier

TYPICAL CHARACTERISTICS

Voltage gain (differential)	50,000
Input impedance	100 k Ω
Input offset voltage	1 mv
D-c drift referred to input	5 μv/°C
Output signal swing, single-ended	±9 v
Common-mode rejection	100 db
Temperature range	−55° to +125°C

SN526A

High-performance Operational Amplifier

TYPICAL CHARACTERISTICS

Voltage gain	1200
Input impedance	2 megohm
Input offset voltage	3 mv
D-c drift referred to input	15 μv/°C
Output signal swing, single-ended	±6 v (R_L = 600 Ω)
Common-mode rejection	80 db
Temperature range	−55° to +125°C

Series 55 High-frequency Amplifiers

- High level of complexity — up to seven stages per bar
- Transistor f_T of over 1Gc.
- Standard TO-84 welded flat package

SN5500

Magnetic-core Sense Amplifier

TYPICAL CHARACTERISTICS

Input threshold voltage level	17 mv
"Off" output level	3.2 v
"On" output level	0.3 v
Common-mode rejection	2 v
Propagation delay	70 nsec
Temperature range	−55° to +125°C

SN5510

Video Differential Amplifier

TYPICAL CHARACTERISTICS

Voltage gain, open-loop, single-ended	40 db
Linear output, single-ended	4 v_{p-p}
Bandwidth, 3 db	40 mc
Common-mode rejection ratio	60 db
Input impedance	3.5 k Ω
Temperature range	−55° to +125°C

Minuteman Series DTL Digital / Linear / Memory

- Proved reliability in Minuteman II guidance and control-system applications
- Multiple circuit functions per package
- Standard TO-84 welded flat package

TYPICAL CHARACTERISTICS

Parameters	Basic Gate	Flip-flop
Propagation delay	140 nsec	250 nsec
Power dissipation	20-40 mw	90 mw
Fan-out	12	12
D-c noise margin	500 mv	500 mv
Supply voltage	+6 v, —3 v	+6 v, —3 v
Temperature range	0° to +65°C	0° to +65°C

SN337A — Flip-flop
SN341A — 7-input NAND/NOR Gate (Clocked)
SN344A — Triple High-level Inverter
SN347A — Dual 4-input, Low-level NAND/NOR Gate (Clocked)
SN359A — Dual 4-input, Low-level NAND/NOR Gate (Unclocked)
SN343A — Dual Input Network
SN346A — Dual Output Driver

SN350A
General-purpose Amplifier

This general-purpose amplifier offers differential inputs and outputs, low offset voltages, and high common-mode rejection ratios.

SN352A
General-purpose Amplifier

The SN352A offers both differential inputs and outputs, plus a high voltage gain of 2000 minimum and an 80-db common-mode rejection ratio.

SN354A
Demodulator Chopper

The SN354A enables a d-c or low-frequency a-c signal to modulate a higher-frequency a-c signal — the drive voltage — producing a modulated a-c signal.

SN355A
Driver Switch

The SN355A performs as a power amplifier, separating the input signal into two output signals which are 180 degrees out of phase.

SN340A
Low-level Switch

This is a dual switching device utilizing diode inputs coupled to common-collector npn output transistors. An input level of plus 3.0 vdc causes the corresponding output to be in the conducting or "true" state; an input level of 0.35 vdc causes the corresponding output to be in the non-conducting or "false" state.

SN348A
Matrix Switch

This is a matrix switch for application in digital computer systems, data-handling systems and control systems. It performs as a triple 2-input NOR gate, with differing logic levels on inputs and outputs.

SN342A
Read Preamplifier

The SN342A is a voltage amplifier whose nominal gain can be varied by externally altering the value of an internal resistor with six taps.

Special Amplifiers

SN777
Low-level Audio Amplifier

TYPICAL CHARACTERISTICS

Frequency response (3db from 1 KC ref)	
Lower cut off	20 cps
Upper cut off	10 kc
Voltage gain at min volume attenuation	72 db
A-c signal swing across load,	
800 Ω a-c, 100 Ω d-c	±2.5 v
Power out	0.75 mw
Total harmonic distortion, 1 kc	2.1%

SNX1303
Thermal-feedback Video Amplifier

TYPICAL CHARACTERISTICS

Frequency response	50 cps to 10 mc
Voltage gain,	
Midband	48 db
D-c	16 db
Input signal before overloading,	
Midband	4 mv
D-c	150 mv
Dynamic output swing,	
no load	1.5 v_{p-p}

GROWN JUNCTION

Type	Case	Mfg Process	Polarity	Rated V_{CBO} v	$r_{CE(sat)}$ ohms	h_{fe}	Pwr Diss 25°C free air mw
2N117	A	GJ	NPN	45	200	9-20	150
USN2N117	A	GJ	NPN	45	200	9-20	150
2N118	A	GJ	NPN	45	200	18-40	150
2N118A	A	GJ	NPN	45	200	18-90	150
USN2N118A	A	GJ	NPN	45	200	18-90	150
JAN2N118A	A	GJ	NPN	45	200	18-90	150
2N119	A	GJ	NPN	45	200	36-90	150
USN2N119	A	GJ	NPN	45	200	36-90	150
2N120	A	GJ	NPN	45	200	76-333	150
2N332	I-3 (TO-5)	GJ	NPN	45	200	9-20	150
USN2N332	I-3 (TO-5)	GJ	NPN	45	200	9-20	150
2N332A	I-3 (TO-5)	GJ	NPN	45	200	18-40	500
2N333	I-3 (TO-5)	GJ	NPN	45	200	18-40	150
USN2N333	I-3 (TO-5)	GJ	NPN	45	200	9-20	150
JAN2N333	I-3 (TO-5)	GJ	NPN	45	200	18-40	150
2N333A	I-3 (TO-5)	GJ	NPN	45	200	18-40	500
2N334	I-3 (TO-5)	GJ	NPN	45	200	18-40	150
USN2N334	I-3 (TO-5)	GJ	NPN	45	200	18-90	150
2N334A	I-3 (TO-5)	GJ	NPN	45	200	18-90	500
2N335	I-3 (TO-5)	GJ	NPN	45	200	36-90	150
USN2N335	I-3 (TO-5)	GJ	NPN	45	200	36-90	150
JAN2N335	I-3 (TO-5)	GJ	NPN	45	200	36-90	150
2N335A	I-3 (TO-5)	GJ	NPN	45	200	36-90	500
2N336	I-3 (TO-5)	GJ	NPN	45	200	76-333	150
JAN2N336	I-3 (TO-5)	GJ	NPN	45	200	76-333	150
2N336A	I-3 (TO-5)	GJ	NPN	45	200	76-333	500
2N470	I-3 (TO-5)	GJ	NPN	15	300	10-25	200
2N471	I-3 (TO-5)	GJ	NPN	30	300	10-25	200
2N472	I-3 (TO-5)	GJ	NPN	45	300	10-25	200
2N473	I-3 (TO-5)	GJ	NPN	15	300	20-50	200
2N474	I-3 (TO-5)	GJ	NPN	30	300	20-50	200
2N475	I-3 (TO-5)	GJ	NPN	45	300	20-50	200
2N476	I-3 (TO-5)	GJ	NPN	15	300	30-60	200
2N477	I-3 (TO-5)	GJ	NPN	30	300	30-60	200
2N478	I-3 (TO-5)	GJ	NPN	15	300	40-100	200
2N479	I-3 (TO-5)	GJ	NPN	30	300	40-100	200
2N480	I-3 (TO-5)	GJ	NPN	45	300	40-100	200
2N541	I-3 (TO-5)	GJ	NPN	15	300	80-200	200
2N542	I-3 (TO-5)	GJ	NPN	30	300	80-200	200
2N543	I-3 (TO-5)	GJ	NPN	45	300	80-200	200
2N1149	A	GJ	NPN	45	200	9-20	150
2N1150	A	GJ	NPN	45	200	18-40	150
2N1151	A	GJ	NPN	45	200	18-90	150
2N1152	A	GJ	NPN	45	200	36-90	150
2N1153	A	GJ	NPN	45	200	76-333	150
2N1276	I-3 (TO-5)	GJ	NPN	40	200	9-22	150
2N1277	I-3 (TO-5)	GJ	NPN	40	200	18-44	150
2N1278	I-3 (TO-5)	GJ	NPN	40	200	37-90	150
2N1279	I-3 (TO-5)	GJ	NPN	40	200	76-333	150
TI480	J (TO-11)	GJ	NPN	50	350	9-36	600
TI481	J (TO-11)	GJ	NPN	80	350	9-36	600
TI492	I-3 (TO-5)	GJ	NPN	40	300	15-45	150
TI493	I-3 (TO-5)	GJ	NPN	40	150	15-45*	125
TI494	I-3 (TO-5)	GJ	NPN	40	150	40-125*	125
TI495	I-3 (TO-5)	GJ	NPN	40	150	120-250*	125
TI496	J (TO-11)	GJ	NPN	70	500	10 min*	600
2N1586/J-503	J (TO-11)	GJ	NPN	15	300	9-27	150
2N1587/J-504	J (TO-11)	GJ	NPN	30	300	9-27	150
2N1588/J-505	J (TO-11)	GJ	NPN	60	300	9-27	150
2N1589/J-506	J (TO-11)	GJ	NPN	15	300	25-75	150
2N1590/J-507	J (TO-11)	GJ	NPN	30	300	25-75	150
2N1591/J-508	J (TO-11)	GJ	NPN	60	300	25-75	150
2N1592/J-509	J (TO-11)	GJ	NPN	15	300	70-210	150
2N1593/J-510		GJ	NPN	30	300	70-210	150
2N1594/J-511		GJ	NPN	60	300	70-210	150

*h_{FE}

SWITCHING GROWN JUNCTION

Type	Case	Rated V_{CBO} v	$r_{CE(sat)}$ ohms	h_{FE}	Power Diss T_A = 25°C mw
2N264	A	45	150	20-55	125
2N337	I (TO-5)	45	150	20-55	125
USN2N337	I (TO-5)	45	150	20-55	125
JAN2N337	I (TO-5)	45	150	20-55	125
2N338	I (TO-5)	45	150	45-150	125
USN2N338	I (TO-5)	45	150	45-150	125
JAN2N338	I (TO-5)	45	150	45-150	125

GROWN JUNCTION TETRODE

Type	Case	Rated V_{CBO} v	$r_{CE(sat)}$ ohms	h_{fe}	Power Diss T_A = 25°C mw
3N34	H (TO-12)	30	300	30	125
3N35	H (TO-12)	30	300	70	125
JAN3N35	H (TO-12)	30	300	70	125

MEDIUM POWER GROWN JUNCTION

Type	Case	Rated V_{CBO} v	$r_{CE(sat)}$ ohms	h_{fe}	Power Dissipation T_C = 25°C w
2N243	A	60	350	9-30	0.75
2N244	A	60	350	9-30	0.75
2N339	J (TO-11)	55	300	9-90	1
2N340	J (TO-11)	85	350	9-90	1
2N341	J (TO-11)	125	400	9-90	1
JAN2N341	J (TO-11)	125	400	9-90	1
USN2N341M	J (TO-11)	125	400	9-90	1
2N342	J (TO-11)	60	350	9-32	1
JAN2N342	J (TO-11)	60	350	9-32	1
2N342A	J (TO-11)	85	350	9-32	1
JAN2N342A	J (TO-11)	85	350	9-32	1
2N342B	J (TO-11)	85	200	7-32	1
2N243	J (TO-11)	60	350	28-90	1
JAN2N343	J (TO-11)	60	350	28-90	1
2N343B	J (TO-11)	65	200	20-90	1
2N1154	A	50	300	9 Min.	0.75
2N1155	A	80	350	9 Min.	0.75
2N1156	A	120	400	9 Min.	0.75

NPN GENERAL PURPOSE

Type	Case	Mfg Proc	Rated V_{CBO} V	Pwr Diss 25°C Free Air (25°C Case) W	h_{FE}	$V_{CE\ (sat)}$ V
TI482	I-2† (TO-5)	P	20	0.6	20 min	1.5
TI483	I-2† (TO-5)	P	40	0.6	20-60	1.5
TI484	I-2† (TO-5)	P	40	0.6	40-120	1.5
2N696	I-2† (TO-5)	P	60	0.6	20-60	1.5
USA2N696	I-2† (TO-5)	P	60	0.6	20-60	1.5
JAN2N696	I-2† (TO-5)	P	60	0.6	20-60	1.5
2N697	I-2† (TO-5)	P	60	0.6	40-120	1.5
USA2N697	I-2† (TO-5)	P	60	0.6	40-120	1.5
JAN2N697	I-2† (TO-5)	P	60	0.6	40-120	1.5
2N698	I-2† (TO-5)	P	120	0.8	20-60	5
2N699	I-2† (TO-5)	P	120	0.6	40-120	5
2N702	R† (TO-18)	P	25	0.3	20-60	0.5
USA2N702	R† (TO-18)	P	25	0.3	20-60	0.5
2N703	R† (TO-18)	P	25	0.3	40-100	0.5
USA2N703	R† (TO-18)	P	25	0.3	40-100	0.5
2N717	R† (TO-18)	P	60	0.4	20-60	1.5
2N718	R† (TO-18)	P	60	0.4	40-120	1.5
2N718A	R† (TO-18)	P	75	0.5	40-120	1.5
USN2N718A	R† (TO-18)	P	75	0.5	40-120	1.5
JAN2N718A	R† (TO18)	P	75	0.5	40-120	1.5
2N719	R† (TO-18)	P	120	0.4	20-60	5
2N719A	R† (TO-18)	P	120	0.5	20-60	5
2N720	R† (TO-18)	P	120	0.4	40-120	5
2N720A	R† (TO-18)	P	120	0.5	40-120	5
2N730	R† (TO-18)	P	60	0.5	20-60	1.5
2N731	R† (TO-18)	P	60	0.5	40-120	1.5
2N870	R† (TO-18)	P	100	0.5	40-120	5
2N871	R† (TO-18)	P	100	0.5	100-300	5
2N910	R† (TO-18)	P	100	0.5	75 min	0.4
USA2N910	R† (TO-18)	P	100	0.5	75 min	0.4
2N911	R† (TO-18)	P	100	0.5	35 min	0.4
USA2N911	R† (TO-18)	P	100	0.5	35 min	0.4
2N912	R† (TO-18)	P	100	0.5	15 min	0.4
2N956	R† (TO-18)	P	75	0.5	100-300	1.5
2N1420	I-2† (TO-5)	P	60	0.6	100-300	1.5
2N1507	I-2† (TO-5)	P	60	0.6	100-300	1.5
2N1613	I-2† (TO-5)	P	75	(0.8)	40-120	1.5
USN2N1613	I-2† (TO-5)	P	75	0.8	40-120	1.5
JAN2N1613	I-2† (TO-5)	P	75	0.8	40-120	1.5
2N1711	I-2† (TO-5)	P	75	0.8	100-300	1.5
USN2N1711	I-2† (TO-5)	P	75	0.8	100-300	1.5
JAN2N1711	I-2† (TO-5)	P	75	0.8	100-300	1.5
2N1889	I-2† (TO-5)	P	100	0.8	40-120	5
2N1890	I-2† (TO-5)	P	100	0.8	100-300	5
USN2N1890	I-2† (TO-5)	P	100	0.8	100-300	5
JAN2N1890	I-2† (TO-5)	P	100	0.8	100-300	5
2N1893	I-2† (TO-5)	P	120	0.8	40-120	5
USN2N1893	I-2† (TO-5)	P	120	0.8	40-120	5
JAN2N1893	I-2† (TO-5)	P	120	0.8	40-120	5
2N1973	I-2† (TO-5)	P	100	0.8	75 min	0.4
2N1974	I-2† (TO-5)	P	100	0.8	35 min	0.4
2N1975	I-2† (TO-5)	P	100	0.8	15 min	0.4
2N2192	I-2† (TO-5)	EP	60	0.8	100-300	0.35
2N2192A	I-2† (TO-5)	EP	60	0.8	100-300	0.25
2N2193	I-2† (TO-5)	EP	60	0.8	40-120	0.35
2N2193A	I-2† (TO-5)	EP	60	0.8	40-120	0.25
2N2194	I-2† (TO-5)	EP	60	0.8	20-60	0.35
2N2194A	I-2† (TO-5)	EP	60	0.8	20-60	0.25
2N2217	I-2† (TO-5)	EP	60	0.8	20-40	0.4
2N2218	I-2† (TO-5)	EP	60	0.8	40-120	0.4
USN2N2218	I-2† (TO-5)	EP	60	0.8	40-120	0.4
2N2218A	I-2† (TO-5)	EP	60	0.8	40-120	0.4
2N2219	I-2† (TO-5)	EP	60	0.8	100-300	0.4
USA2N2219	I-2† (TO-5)	EP	60	0.8	100-300	0.4
2N2219A	I-2† (TO-5)	EP	60	0.8	100-300	0.4
2N2220	R† (TO-18)	EP	60	0.5	20-40	0.4
2N2221	R† (TO-18)	EP	60	0.5	40-120	0.4
USA2N2221	R† (TO-18)	EP	60	0.5	40-120	0.4
2N2221A	R† (TO-18)	EP	60	0.5	40-120	0.4
2N2222	R† (TO-18)	EP	60	0.5	100-300	0.4
USA2N2222	R† (TO-18)	EP	60	0.5	100-300	0.4
2N2222A	R† (TO-18)	EP	60	0.5	100-300	0.4
2N2243	I-2† (TO-5)	EP	60	0.8	40-120	0.35
2N2243A	I-2† (TO-5)	EP	60	0.8	40-120	0.25
2N3036	I-2† (TO-5)	EP	120	0.8	50-150	0.25
2N3114	I-2† (TO-5)	EP	150	0.8	30-120	1

† Collector is in electrical contact with case.

PNP GENERAL PURPOSE

Type	Case	Mfg Proc	Rated V_{CBO} v	Pwr Diss 25°C Free Air (25°C Case) w	h_{FE}	$V_{CE(sat)}$ v
2N721	R† (TO-18)	EP	50	400	20-45	1.5
2N722	R† (TO-18)	EP	50	400	30-90	1.5
2N1131	I-2† (TO-5)	EP	50	600	20-45	1.5
USN2N1131	I-2† (TO-5)	EP	50	600	20-45	1.5
2N1132	I-2† (TO-5)	EP	50	600	30-90	1.5
USN2N1132	I-2† (TO-5)	EP	50	600	30-90	1.5
2N2695	MMM† (TO-46)	EP	25	360	30-130	0.25
2N2696	R† (TO-18)	EP	25	360	30-130	0.25
2N2904	I-2† (TO-5)	EP	60	600	40-120	0.4
USA2N2904	I-2† (TO-5)	EP	60	600	40-120	0.4
2N2904A	I-2† (TO-5)	EP	60	600	40-120	0.4
2N2905	I-2† (TO-5)	EP	60	600	100-300	0.4
USA2N2905	I-2† (TO-5)	EP	60	600	100-300	0.4
2N2905A	I-2† (TO-5)	EP	60	600	100-300	0.4
2N2906	R† (TO-18)	EP	60	400	40-120	0.4
USA2N2906	R† (TO-18)	EP	60	400	40-120	0.4
2N2906A	R† (TO-18)	EP	60	400	40-120	0.4
2N2907	R† (TO-18)	EP	60	400	100-300	0.4
USA2N2907	R† (TO-18)	EP	60	400	100-300	0.4
2N2907A	R† (TO-18)	EP	60	400	100-300	0.4

NPN SWITCH

Type	Case	Mfg Proc	Min f_T Mc	Pwr Diss 25°C Free Air (25°C Case) mw	V_{BE} Base-emitter Voltage v	Rated V_{CEO} v	Max Storage Time (Turn-off time) nsec	Max Storage Time (Turn-off time) at Ic ma
T1485	R† (TO-18)	EP	100	300	0.65-1.0	14		
2N706	R† (TO-18)	EP	200	300	0.9 max	15	60	10
USA2N706	R† (TO-18)	EP	200	300	0.9 max	15	60	10
JAN2N706	R† (TO-18)	EP	200	300	0.9 max	15	60	10
2N706A	R† (TO-18)	EP	200	300	0.9 max	15	25	10
2N706B	R† (TO-18)	EP	200	300	0.9 max	15	25	10
2N708	R† (TO-18)	EP	300	360	0.72-0.80	15	25	10
2N708A	R† (TO-18)	EP	300	360	0.72-0.80	20	25	10
2N709	R† (TO-18)	EP	600	300	0.7 -0.85	6	6	6
2N743	R† (TO-18)	EP	282	300	1.1 max	12	14	10
2N744	R† (TO-18)	EP	282	300	1.1 max	12	18	10
USN2N744	R† (TO-18)	EP	282	300	1.1 max	12	18	10
2N753	R† (TO-18)	EP	200	300	0.7 -0.9	15	35	10
2N914	R† (TO-18)	EP	300	360	0.7 -0.8	15	20	20
2N1252	I-2† (TO-5)	EP	40	600	1.3 max	20	60	150
2N1253	I-3† (TO-5)	EP	50	600	1.3 max	20	60	150
2N2368	R† (TO-18)	EP	400	360	0.7 -0.85	15	10	10
2N2369	R† (TO-18)	EP	500	360	0.7 -0.85	15	13	10
2N2369A	R† (TO-18)	EP	500	360	0.7 -0.85	15	13	10
2N2410	I-2† (TO-5)	EP	200	800	1.2 max	40	40	150
2N2481	R† (TO-18)	EP	300	360	0.7-0.82	15	20	10
USN2N2481	R† (TO-18)	EP	300	360	0.7 -0.82	15	20	10
2N2537	I-2† (TO-5)	EP	250	800	1.3 max	30	20	20
2N2538	I-2† (TO-5)	EP	250	800	1.3 max	30	20	20
2N2539	R† (TO-18)	EP	250	500	1.3 max	30	20	20
2N2540	R† (TO-18)	EP	250	500	1.3 max	30	20	20
2N2692	R† (TO-18)	EP	150	300	0.7 max	30	500	0.1
2N2693	R† (TO-18)	EP	150	300	0.7 max	30	900	0.1
2N2694	R† (TO-18)	EP	150	300	0.7 max	20	1800	0.1
2N3009	RRR† (TO-52)	EP	350	360	0.75-0.95	15	18	10
2N3010	R† (TO-18)	EP	600	300	0.65-0.85	6	6	6
2N3011	R† (TO-18)	EP	400	360	0.72-0.87	12	13	10
2N3013	RRR† (TO-52)	EP	350	360	0.75-0.95	15	18	10
2N3014	RRR† (TO-52)	EP	350	360	0.7 -0.8	20	18	10
2N3015	I-2† (TO-5)	EP	250	800	1.2 max	30	(60)	500
2N3252	I-2† (TO-5)	EP	200	800	0.7 -1.3	30	40	1000
2N3253	I-2† (TO-5)	EP	175	800	0.7 -1.3	40	40	1000
2N3303	UUU	EP	450	600	0.78 max	12	15	100
2N3444	I-2† (TO-5)	EP	150	800	0.7 -1.3	50	40	1000
2N3554	I-2† (TO-5)	EP	150	800	0.9 -1.4	30	65	1000
2N3829	RRR (TO-52)	EP	350	360	0.75-0.85	20	50	30
2N3830	I (TO-5)	EP	200	1000	1 max	50	40	1000
2N3831	I (TO-5)	EP	200	1000	1 max	40	40	1000
2N3832	VVV (TO-72)	EP	1000	200	0.78-0.93	6	10	2

PNP SWITCH

Type	Case	Mfg Process	Min f_T Mc	Pwr Diss 25°C Free Air (25°C Case) mw	V_{BE} Base-emitter Voltage v	Rated V_{CEO} v	Max Storage Time (Turn-off time) nsec	Max Storage Time (Turn-off time) at I_C ma
2N726	R† (TO-18)	M	140	300	1 max	20		
2N727	R† (TO-18)	M	140	300	1 max	20		
2N2411	R† (TO-18)	EP	140	300	0.7 -0.9	20	90	10
2N2412	R† (TO-18)	EP	140	300	0.7 -0.9	20	90	10
2N2894	R† (TO-18)	EP	400	360	0.78-0.98	12	(90)	30
2N3012	R† (TO-18)	EP	400	360	0.78-0.98	12	(75)	30
2N3304	R† (TO-18)	EP	500	300	1 max	6	30	30
2N3576	R† (TO-18)	EP	400	360	0.75-0.95	15	30	10

NPN AVALANCHE SWITCH

			Min Collector Hold-off Current ma	Output Pulse Amplitude v	V_{BE} Base-emitter Voltage v	$V_{(BR)CER}$ v	Turn-on Time nsec
2N3033	R† (TO-18)	EM	2	45	1.5 max	100	5
2N3034	R† (TO-18)	EM	2	30	1.5 max	70	5
2N3035	R† (TO-18)	EM	2	20	1.5 max	50	5

NPN LOW-LEVEL AMPLIFIER

Type	Case	Mfg Process	I_C Range ma	Rated V_{CEO} v	Max Noise Figure db	Min f_T (f_{hfb}) Mc
TIS22	WWW	P	0.01-50	45		30
TIS23	WWW	P	0.01-50	45		30
TIS24	WWW	P	0.001-50	60	5	60
2N734	R† (TO-18)	M	1-30	60		30
2N735	R† (TO-18)	M	1-30	60		60
2N736	R† (TO-18)	M	1-30	60		60
2N736A	R† (TO-18)	M	1-30	80		100
2N738	R† (TO-18)	M	1-30	80		30
2N739	R† (TO-18)	M	1-30	80		60
2N740	R† (TO-18)	M	1-30	80		60
2N759A	R† (TO-18)	M	1-30	60		(50)
USA2N759A	R† (TO-18)	M	1-30	60	24	(60)
2N760	R† (TO-18)	M	.1-30	45		(50)
2N760A	R† (TO-18)	M	.1-30	60		(50)
USA2N760A	R† (TO-18)	M	.1-30	60	24	60
2N780-TI490	R† (TO-18)	M	.03-10	45	7	60
2N929	R† (TO-18)	P	.01-30	45	4	30
USA2N929	R† (TO-18)	P	.01-30	45	4	30
JAN2N929	R† (TO-18)	P	0.01-30	45	4	30
2N930	R† (TO-18)	P	.01-30	45	3	30
USA2N930	R† (TO-18)	P	.01-30	45	3	30
JAN2N930	R† (TO-18)	P	0.01-30	45	3	30
2N1247	I-2† (TO-5)	P	.005-1	6	3.7 (typ)	
2N1248	I-2† (TO-5)	P	.02-1	6	3.7 (typ)	
2N1564	I-2† (TO-5)	M	1-30	60		30
2N1565	I-2† (TO-5)	M	1-30	60		60
2N1566	I-2† (TO-5)	M	.1-30	60		60
2N1566A	I-2† (TO-5)	M	.1-30	80		100
2N1572	I-2† (TO-5)	M	1-30	80		30
2N1573	I-2† (TO-5)	M	1-30	80		60
2N1574	I-2† (TO-5)	M	1-30	80		60
2N2483	R† (TO-18)	P	.01-10	60	3	60
2N2484	R† (TO-18)	P	.001-10	60	2	60
2N2586	R† (TO-18)	P	.001-10	45	2	45

PNP LOW-LEVEL AMPLIFIER

2N2604	MMM† (TO-46)	EP	.01-10	45	4	30
2N2605	MMM† (TO-46)	EP	.01-10	45	3	30
2N2861	R† (TO-18)	EP	.01-10	20	1.1	60
2N2862	R† (TO-18)	EP	.01-10	20	1.5	45

NPN HIGH-FREQUENCY AMPLIFIER-OSCILLATOR

Type	Case	Mfg Process	Min f_T Mc	Pwr Diss 25°C Free Air (25°C Case) mw	C_{obo} pf	Min Oscillator Pwr Out mw	Min Oscillator Pwr Out at f Mc
TIXS09	SSS†	EP		200	1.7	30	1500
TIXS10	SSS†	EP		200	1.7	30	1000
TIXS12	XXX‡	EP	1500 (typ)	1000	10	250	1500
TIXS13	XXX‡	EP	1200 (typ)	1000	10	125	1500
TIX3016A	SSS†	EP	1900 (typ)	200	1.7	30	2000
2N715	R† (TO-18)	P	70	500	6	200	70
2N716	R† (TO-18)	P	70	500	6	400	70
USA2N716	R† (TO-18)	P	70	500	6	400	70
2N916	R† (TO-18)	EP	300	360	6		
2N917	R (TO-18)	EP	500	200	1.7	10	500
2N918	R (TO-18)	EP	600	200	1.7	30	500
2N2863	I-2 (TO-5)	EP	150	800	13	1200	50
2N2864	I-2 (TO-5)	EP	150	800	13	1200	50
2N2865	VVV (TO-72)	EP	600	200	2.5	40	500
2N2883	I (TO-5)	EP	400	800	10	500	500
2N2884	I (TO-5)	EP	400	800	10	750	500
2N3570	VVV (TO-72)	EP	1500	200	0.75	60 (typ)	1000
2N3571	VVV (TO-72)	EP	1200	200	0.85		
2N3572	VVV (TO-72)	EP	1000	200	0.85		

†Collector is in electrical contact with case.
‡Base is in electrical contact with the case.

NPN SILICON POWER TRANSISTORS

Type	Case	Mfg Process	I_C max	P_D 25°C Free Air	P_D 100°C Case	$V_{(BR)CEO}$	I_{CES} @ V_{CE} 25°C	h_{FE} Min	h_{FE} Max	I_C
TIX155	D (TO-53)	M	10a	3w	50w	80v	2 ma @ 60v	1500	10000	2a
2N389/USN	D (TO-53)	M	3a	2w	45w	60v■	10 ma @ 60v•	12	60	1a
2N389A	D (TO-53)	M	3a	2w	45w	60v■	10 ma @ 60v•	12	60	1a
2N424/USN	D (TO-53)	M	3a	2w	45w	80v■	10 ma @ 60v•	12	60	1a
2N424A	D (TO-53)	M	3a	2w	45w	80v■	10 ma @ 60v•	12	60	1a
TI486	G(TO-5)	P	.75a	.8w	15w	60v	.3 ma @ 60v‡	20	80	.2a
TI487	S	P	.75a	2w	15w	60v	.3 ma @ 60v‡	20	80	.2a
2N497/JAN	I (TO-5)	P	.5a	.8w	4w**	60v	10 μa @ 30v	12	36	.2a
2N497A	I (TO-5)	P	.5a	.8w	5w**	60v	10 μa @ 30v	12	36	.2a
2N498/JAN	I (TO-5)	P	.5a	.8w	4w**	100v	10 μa @ 30v	12	36	.2a
2N498A	I (TO-5)	P	.5a	.8w	5w**	100v	10 μa @ 30v	12	36	.2a
2N656/JAN	I (TO-5)	P	.5a	.8w	4w**	60v	10 μa @ 30v	30	90	.2a
2N656A	I (TO-5)	P	.5a	.8w	5w**	60v	10 μa @ 30v	30	90	.2a
2N657/JAN	I (TO-5)	P	.5a	.8w	4w**	100v	10 μa @ 30v	30	90	.2a
2N657A	I (TO-5)	P	.5a	.8w	5w**	100v	10 μa @ 30v	30	90	.2a
2N1047	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	12	36	.5a
2N1047A/USN	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	12	36	.5a
2N1047B	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	12	36	.5a
2N1048	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	12	36	.5a
2N1048A/USN	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	12	36	.5a
2N1048B	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	12	36	.5a
2N1049	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	30	90	.5a
2N1049A/USN	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	30	90	.5a
2N1049B	F (TO-57)	EP	1a	1w	23w	80v	.25 ma @ 80v	30	90	.5a
2N1050	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	30	90	.5a
2N1050A/USN	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	30	90	.5a
2N1050B	F (TO-57)	EP	1a	1w	23w	120v	.25 ma @ 120v	30	90	.5a
TI1121	D (TO-53)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	30	120	2a
TI1122	D (TO-53)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	15	60	2a
TI1123	D (TO-53)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	30	120	2a
TI1124	D (TO-53)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	15	60	2a
TI1125	D (TO-53)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	30	120	2a
TI1126	D (TO-53)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	15	60	2a
TI1131	N (TO-61)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	30	120	2a
TI1132	N (TO-61)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	15	60	2a
TI1133	N (TO-61)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	30	120	2a
TI1134	N (TO-61)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	15	60	2a
TI1135	N (TO-61)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	30	120	2a
TI1136	N (TO-61)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	15	60	2a
TI1141	D (TO-53)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	20	80	5a
TI1142	D (TO-53)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	10	40	5a
TI1143	D (TO-53)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	20	80	5a
TI1144	D (TO-53)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	10	40	5a
TI1145	D (TO-53)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	20	80	5a
TI1146	D (TO-53)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	10	40	5a
TI1151	N (TO-61)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	20	80	5a
TI1152	N (TO-61)	M	7.5a	3w	80w*	100v	10 ma @ 100v‡	10	40	5a
TI1153	N (TO-61)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	20	80	5a
TI1154	N (TO-61)	M	7.5a	3w	80w*	75v	10 ma @ 75v‡	10	40	5a
TI1155	N (TO-61)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	20	80	5a
TI1156	N (TO-61)	M	7.5a	3w	80w*	50v	10 ma @ 50v‡	10	40	5a
2N1487	K (TO-3)	EP	6a	—	30w	40v	25 μa @ 30v	15	45	1.5a
2N1488	K (TO-3)	EP	6a	—	30w	55v	25 μa @ 30v	15	45	1.5a
2N1489	K (TO-3)	EP	6a	—	30w	40v	25 μa @ 30v	25	75	1.5a
2N1490	K (TO-3)	EP	6a	—	30w	55v	25 μa @ 30v	25	75	1.5a
2N1714/USA	G(TO-5)	P	.75a	.8w	10w	60v	50 μa @ 90v	20	60	.2a
2N1715/USA	G(TO-5)	P	.75a	.8w	10w	100v	50 μa @ 150v	20	60	.2a
2N1716/USA	G(TO-5)	P	.75a	.8w	10w	60v	50 μa @ 90v	40	120	.2a
2N1717/USA	G(TO-5)	P	.75a	.8w	10w	100v	50 μa @ 150v	40	120	.2a
2N1718	S	P	.75a	2w	10w	60v	50 μa @ 90v	20	60	.2a
2N1719	S	P	.75a	2w	10w	100v	50 μa @ 150v	20	60	.2a
2N1720	S	P	.75a	2w	10w	60v	50 μa @ 90v	40	120	.2a
2N1721	S	P	.75a	2w	10w	100v	50 μa @ 150v	40	120	.2a
2N1722	D (TO-53)	M	7.5a	3w	50w	80v	2 ma @ 60v‡	20	90	2a
JAN2N1722	D (TO-53)	M	7.5a	3w	50w	80v	1.5 ma @ 60 v‡	30	90	2a
2N1722A	D (TO-53)	M	7.5a	3w	50w	120v	2 ma @ 100v‡	30	90	2a
2N1723	D (TO-53)	M	7.5a	3w	50w	80v	2 ma @ 60v‡	50	150	2a
2N1724	N (TO-61)	M	7.5a	3w	50w	80v	2 ma @ 60v‡	20	90	2a
JAN2N1724	N (TO-61)	M	7.5a	3w	50w	80v	1.5 ma @ 60 v‡	30	90	2a
2N1724A	N (TO-61)	M	7.5a	3w	50w	120v	2 ma @ 100v‡	30	90	2a
2N1725	N (TO-61)	M	7.5a	3w	50w	80v	2 ma @ 60v‡	50	150	2a
2N1936	P (TO-63)	M	20a	4w	150w	60v	10 ma @ 60v‡	10	50	10a
2N1937	P (TO-63)	M	20a	4w	150w	80v	10 ma @ 80v‡	10	50	10a
2N2150	T	EP	2a	2w	30w	80v	10 μa @ 120v	20	60	1a
2N2151	T	EP	2a	2w	30w	80v	10 μa @ 120v	40	120	1a
2N2987	I (TO-5)	P	1a	1w	15w	80v	15 μa @ 175°C, 90v	25	75	.2a

** at 25°C * at 55°C ■ $V_{(BR)CER}$ • at 100°C ‡ at 150°C

NPN SILICON POWER TRANSISTORS

Type	Case	Mfg Process	I_C max	P_D 25°C Free Air	P_D 100°C Case	$V_{(BR)CEO}$	I_{CES} @V_{CE} 25°C	h_{FE} Min	h_{FE} Max	I_C
2N2988	I (TO-5)	P	1a	1w	15w	100v	15 μa @ 175°C, 150v	25	75	.2a
2N2989	I (TO-5)	P	1a	1w	15w	80v	15 μa @ 175°C, 90v	60	120	.2a
2N2990	I (TO-5)	P	1a	1w	15w	100v	15 μa @ 175°C, 150v	60	120	.2a
2N2991	S	P	1a	2w	15w	80v	15 μa @ 175°C, 90v	25	75	.2a
2N2992	S	P	1a	2w	15w	100v	15 μa @ 175°C, 150v	25	75	.2a
2N2993	S	P	1a	2w	15w	80v	15 μa @ 175°C, 90v	60	120	.2a
2N2994	S	P	1a	2w	15w	100v	15 μa @ 175°C, 150v	60	120	.2a
2N3418	I (TO-5)	EP	5a	.8w	10w	60v	.03 μa @ 80v	20/10	60	1a/5a
2N3419	I (TO-5)	EP	5a	.8w	10w	80v	.03 μa @ 120v	20/10	60	1a/5a
2N3420	I (TO-5)	EP	5a	.8w	10w	60v	.03 μa @ 80v	40/15	120	1a/5a
2N3421	I (TO-5)	EP	5a	.8w	10w	80v	.03 μa @ 120v	40/15	120	1a/5a
2N3551	DDD	EP	12a	2w	40w	60v	10 ma @ 110v‡	20	90	10a
2N3552	DDD	EP	12a	2w	40w	80v	10 ma @ 135v‡	20	90	10a
2N3836	OOO	EP	7a	1w	25w**	60v	10μa @ 80v	2000	20000	2a
2N3837	OOO	EP	7a	1w	25w**	80v	10μa @ 100v	2000	20000	2a
2N3846	P (TO-63)	M	20a	4w	150w	200v	2ma @ 300v	10	60	10a
2N3847	P (TO-63)	M	20a	4w	150w	300v	2ma @ 400v	10	60	10a
2N3848	P (TO-63)	M	20a	4w	150w	200v	2ma @ 300v	10	60	15a
2N3849	P (TO-63)	M	20a	4w	150w	300v	2ma @ 400v	10	60	15a

PNP SILICON POWER TRANSISTORS

Type	Case	Mfg Process	I_C max	P_D 25°C Free Air	P_D 100°C Case	$V_{(BR)CEO}$	I_{CES} @V_{CE} 25°C	h_{FE} Min	h_{FE} Max	I_C
TIXP07	D (TO-53)	EP	7.5a	3w	50w	80v	1.0μa @ 100v	20	90	2a

NPN HIGH FREQUENCY SILICON POWER TRANSISTORS

Type	Case	Mfg Process	I_C max	P_D 25°C Case	$V_{(BR)CEO}$	Effc. @I_C	P_o @Freq
2N2631	PPP (TO-39)	EP	1.5a	8.75w	60v	70% @ 50mc	3w @ 150mc
2N2876	QQQ (TO-60)	EP	2.5a	17.00w	60v	70% @ 50mc	3w @ 150mc

HIGH-FREQUENCY SMALL-SIGNAL

Type	Case	Mfg. Process	Pwr Diss Free Air mw	Collector Current ma	Collector Voltage v	C_{TC} (C_{ob}) pf		NF db		f_T Mc	
						Typ	Max	Typ	Max	Min	Typ
2N1141	M	M	300	100	35	1.2		3.0			750
2N1141A	M	M	300	100	35		1.5	3.0		500	
2N1142	M	M	300	100	30	1.4		3.5			600
USN2N1142	M	M	300	100	30		4	3.5		315	
2N1142A	M	M	300	100	30		2.0	3.5		400	
2N1143	M	M	300	100	25	1.5		4.0			480
2N1143A	M	M	300	100	30		2.0	4.0		400	
2N1195	M	M	225	40	30		(4.0)	4.0		400	
2N1385	M	M	300	100	25		1.8	4.0		250	
2N2188	L	AM	125	30	40		(2.5)	4.5		60	
2N2189	L	AM	125	30	40		(2.5)	4.5		102	
2N2190	L	AM	125	30	60		(2.5)	4.5		60	
2N2191	L	AM	125	30	60		(2.5)	4.5		102	
2N2415	VVV (TO-72)	M	75	20	15		(2.0)		3.0	500	
2N2416	VVV (TO-72)	M	75	20	15		(2.0)		4.0	400	
2N2996	VVV (TO-72)	EM	75	50	15		(3.0)		5.0	400	
2N2997	VVV (TO-72)	EM	75	50	30		(1.8)		4.5	400	
2N2998	VVV (TO-72)	M	75	20	15		(1.7)		8.0	600	
2N2999	VVV (TO-72)	EM	75	20	15		(1.7)		7.0	1400	
TIX3024	O (TO-50)	EP	75	50	15		(3.0)	2.0	2.6	1500	

GENERAL PURPOSE

Type	Case	Mfg. Process	Pwr Diss Free Air mw	Collector Current ma	Collector Voltage v	Emitter Voltage v	h_{FE}		f_{hfb}	
							Min	Max	Min	Typ
2N650	I-2 (TO-5)	A	200	500	45	30	33			0.75
2N650A	I-2 (TO-5)	A	200	500	45	30	33			0.75
2N651	I-2 (TO-5)	A	200	500	45	30	45			1.0
2N651A	I-2 (TO-5)	A	200	500	45	30	45			1.0
USN2N651A	I-2 (TO-5)	A	200	500	45	30	45	150		1.0
JAN2N651A	I-2 (TO-5)	A	200	500	45	30	45	150		1.0
2N652	I-2 (TO-5)	A	200	500	45	30	80			1.25
2N652A	I-2 (TO-5)	A	200	500	45	30	80			1.25
USN2N652A	I-2 (TO-5)	A	200	500	45	30	80	250		1.25
JAN2N652A	I-2 (TO-5)	A	200	500	45	30	80	250		1.25
2N658	I-2 (TO-5)	A	250	1000	30	12	25	80	2.5	
2N659	I-2 (TO-5)	A	250	1000	30	12	40	110	5	
2N660	I-2 (TO-5)	A	250	1000	30	12	60	150	10	
2N661	I-2 (TO-5)	A	250	1000	30	12	80		15	
2N662	I-2 (TO-5)	A	250	1000	30	12	30		4	
2N1273	I-2 (TO-5)	A	150	150	15	10	30	150		
2N1274	I-2 (TO-5)	A	150	150	25	10	30	150		
2N1370	I-2 (TO-5)	A	150	150	25	10	50	150		5
2N1371	I-2 (TO-5)	A	150	150	45	10	50	150		5
2N1372	I-2 (TO-5)	A	250	200	25	15	30	95		5
2N1373	I-2 (TO-5)	A	250	200	45	25	30	95		5
2N1374	I-2 (TO-5)	A	250	200	25	15	50	150		5
2N1375	I-2 (TO-5)	A	250	200	45	25	50	150		5
2N1376	I-2 (TO-5)	A	250	200	25	15	75	150		5
2N1377	I-2 (TO-5)	A	250	200	45	25	75	150		5
2N1378	I-2 (TO-5)	A	250	200	12	7	95	300		5
2N1379	I-2 (TO-5)	A	250	200	25	15	95	300		5
2N1380	I-2 (TO-5)	A	250	200	12	7	30	300		5
2N1381	I-2 (TO-5)	A	250	200	25	15	30	300		5
2N1382	I-2 (TO-5)	A	200	200	25	15	50	150		5
2N1383	I-2 (TO-5)	A	200	200	25	15	30	150		5

SWITCHING

Type	Case	Mfg Process	Pwr Diss Free Air mw	Collector Current ma	Collector Voltage v	(CTC) Cob pf		rb'Cc psec		fhfb (fT) Mc	
						Typ	Max	Typ	Max	Min	Typ
JAN2N358A	I-2 (TO-5)	A	150	500	30	10		25	75		3
2N388	I-2 (TO-5)	A	150	200	25		20	60	180	5	
USN2N388	I-2 (TO-5)	A	150	200	25		20	60	180	5	
JAN2N388	I-2 (TO-5)	A	150	200	25		20	60	180	5	
2N388A	I-2 (TO-5)	A	150	200	40		20	60	180	5	
2N395	I-2 (TO-5)	A	150	250	30		20	20	150	3	
2N396	I-2 (TO-5)	A	150	250	30		20	30	150	5	
2N397	I-2 (TO-5)	A	150	250	30		20	40	150	10	
2N404	I-2 (TO-5)	A	150	100	25		20	30		4	
USAF2N404	I-2 (TO-5)	A	150	100	25		20	30		4	
JAN2N404	I-2 (TO-5)	A	150	200	25		20	30	200	4	
2N404A	I-2 (TO-5)	A	150	150	40		20	30		4	
USA2N416	I-2 (TO-5)	A	133	300	30		20	45	220	5	
USA2N417	I-2 (TO-5)	A	133	300	30		20	60	260	15	
2N426	I-2 (TO-5)	A	150	400	30		20	30	60	3	
2N427	I-2 (TO-5)	A	150	400	30		20	40	80	5	
USA2N427	I-2 (TO-5)	A	150	400	30		20	40	80	5	
2N428	I-2 (TO-5)	A	150	400	30		20	60		10	
JAN2N428	I-2 (TO-5)	A	150	400	30		20	60	250	10	
2N594†	I-2 (TO-5)	A	150	300	20	17		20		1.5	
2N595†	I-2 (TO-5)	A	150	300	20	17		35		3	
2N596†	I-2 (TO-5)	A	150	300	20	17		50		5	
2N705	R (TO-18)	EM	150	50	15	(5)		25			(300)
USN2N705	R (TO-18)	EM	150	50	15	(5)		25			(300)
JAN2N705	R (TO-18)	EM	150	50	15	(5)		25			(300)
2N710	R (TO-18)	EM	150	50	15	(5)		25			(300)
2N711	R (TO-18)	EM	150	50	12	(5)		20			(300)
2N711A	R (TO-18)	EM	150	100	15		6	25	150	(150)	
2N711B	R (TO-18)	EM	150	100	15		6	30	150	(150)	
2N797	R (TO-18)	EM	150	150	20		4	40		(600)	
TIX895	O (TO-50)	EP	75	75	5		1.5	20		(1200)	
2N960	R (TO-18)	EM	150	100	15		4	20		(300)	
2N961	R (TO-18)	EM	150	100	12		4	20		(300)	
2N962	R (TO-18)	EM	150	100	12		4	20		(300)	
USN2N962	R (TO-18)	EM	150	200	12		5	20		(300)	
2N963	R (TO-18)	EM	150	100	12		4	20			(250)
2N964	R (TO-18)	EM	150	100	15		4	40		(300)	
USN2N964	R (TO-18)	EM	150	200	15		5	40	160	(300)	
2N965	R (TO-18)	EM	150	100	12		4	40		(300)	
2N966	R (TO-18)	EM	150	100	12		4	40		(300)	
2N967	R (TO-18)	EM	150	100	12		5	40			(250)
2N968	R (TO-18)	EM	150	200	15		8	17		(300)	
2N969	R (TO-18)	EM	150	200	12		8	17		(300)	
2N970	R (TO-18)	EM	150	200	12		8	17		(300)	
2N971	R (TO-18)	EM	150	200	7		8	17		(300)	
2N972	R (TO-18)	EM	150	200	15		8	40		(300)	
2N973	R (TO-18)	EM	150	200	12		8	40		(300)	
2N974	R (TO-18)	EM	150	200	12		8	40		(300)	
2N975	R (TO-18)	EM	150	200	7		8	40		(300)	
2N985	R (TO-18)	EM	150	200	15		6	60		(300)	
2N1300	I-2 (TO-5)	AD	150	100	13		14	30		(25)	
2N1301	I-2 (TO-5)	AD	150	100	13		14	30		(35)	
2N1302	I-2 (TO-5)	A	150	300	25		20	20		3	
USN2N1302	I-2 (TO-5)	A	150	300	25		20	20		3	
JAN2N1302	I-2 (TO-5)	A	150	300	25		20	20		3	
2N1303	I-2 (TO-5)	A	150	300	30		20	20		3	
USN2N1303	I-2 (TO-5)	A	150	300	30		20	20		3	
JAN2N1303	I-2 (TO-5)	A	150	300	30		20	20		3	
2N1304	I-2 (TO-5)	A	150	300	25		20	40	200	5	
USN2N1305	I-2 (TO-5)	A	150	300	25		20	40	200	5	
JAN2N1304	I-2 (TO-5)	A	150	300	25		20	40	200	5	
2N1305	I-2 (TO-5)	A	150	300	30		20	40	200	5	
USN2N1305	I-2 (TO-5)	A	150	300	30		20	40	200	5	
JAN2N1305	I-2 (TO-5)	A	150	300	30		20	40	200	5	
2N1306	I-2 (TO-5)	A	150	300	25		20	60	300	10	
USN2N1306	I-2 (TO-5)	A	150	300	25		20	60	300	10	
JAN2N1306	I-2 (TO-5)	A	150	300	25		20	60	300	10	
2N1307	I-2 (TO-5)	A	150	300	30		20	60	300	10	
USN2N1307	I-2 (TO-5)	A	150	300	30		20	60	300	10	
JAN2N1307	I-2 (TO-5)	A	150	300	30		20	60	300	10	
2N1308	I-2 (TO-5)	A	150	300	25		20	80		15	
USN2N1308	I-2 (TO-5)	A	150	300	25		20	80		15	
JAN2N1308	I-2 (TO-5)	A	150	300	25		20	80		15	
2N1309	I-2 (TO-5)	A	150	300	30		20	80		15	
USN2N1309	I-2 (TO-5)	A	150	300	30		20	80		15	
JAN2N1309	I-2 (TO-5)	A	150	300	30		20	80		15	
2N1404	I-2 (TO-5)	A	150	300	25		20	30		4	
2N1605	I-2 (TO-5)	A	150	100	25		20	40		4	
2N1683	I-2 (TO-5)	AD	150	100	13		14	50		(50)	
2N1808	I-2 (TO-5)	A	150	300	25		20	30		4	

†Bi-directional.

SWITCHING (Continued)

Type	Case	Mfg Process	Pwr Diss Free Air mw	Collector Current ma	Collector Voltage v	(C_{TC}) C_{ob} pf Typ	(C_{TC}) C_{ob} pf Max	$r_b C_c$ psec Typ	$r_b C_c$ psec Max	f_{hfb} (f_T) Mc Min	f_{hfb} (f_T) Mc Typ
USN2N1853	I-2 (TO-5)	AD	150	100	18	11		30	400		
USN2N1854	I-2 (TO-5)	AD	150	100	18	11		25		(40)	
2N1993	I-2 (TO-5)	A	150	300	30		20	50	300	3	
2N1994†	I-2 (TO-5)	A	150	300	30		20	15		3	
2N1995†	I-2 (TO-5)	A	150	300	25		20	25		5	
2N1996†	I-2 (TO-5)	A	150	300	20		20	35		8	
2N1997	I-2 (TO-5)	A	250	500	45		20	40	200		6
2N1998	I-2 (TO-5)	A	250	500	35		20	70	225		10
2N1999	I-2 (TO-5)	A	250	500	30		20	100	350		17
2N2000	I-2 (TO-5)	A	300	1000	50		35	50		2	
2N2001	I-2 (TO-5)	A	300	1000	30		35	30		6	
2N2635	R (TO-18)	EM	150	100	30		5	45	300	(150)	

†Bi-directional.

HIGH-VOLTAGE SWITCHING

						Emitter Voltage v		Min h_{FE}			
2N398	I-2 (TO-5)	A	50	100	105	50		20			0.8
2N398A	I-2 (TO-5)	A	150	200	105	50		20			0.8
2N1310	I-2 (TO-5)	A	120	100	90	20		20			2.4
2N1311	I-2 (TO-5)	A	120	100	75	20		15			2.2
2N1312	I-2 (TO-5)	A	120	100	50	20		20			2.6

GENERAL PURPOSE— POWER

Type	Case	Mfg Process	$I_{C(max)}$	P_D 25°C Case	P_D 25°C Free-air	$V_{(BR)CBO}$	I_{CBO} @ 25°C V_{CBO}†	h_{FE} Min	h_{FE} Max	h_{FE} @ I_C
TI156, L	BBB	A	3a	25w	1w	30v	.65 ma	25	75	500 ma
TI158, L	BBB	A	3a	25w	1w	60v	.65 ma	25	75	500 ma
TI158A, AL	BBB	A	3a	25w	1w	80v	.65 ma	25	75	500 ma
TI159	CCC	A	3a	20w	1.4w	40v	.125 ma	20	60	1a
TI160	CCC	A	3a	20w	1.4w	60v	.125 ma	20	60	1a
TI161	CCC	A	3a	20w	1.4w	80v	.125 ma	20	60	1a
TI162	CCC	A	3a	20w	1.4w	100v	.125 ma	20/60	60/180	1a
2N250A	K(TO-3)	A	7a	90w	—	40v	2 ma	25	100	3a
2N251A	K(TO-3)	A	7a	90w	—	60v	2 ma	25	100	3a
2N456A/USA	K(TO-3)	A	7a	150w	1.75w	40v	.5 ma @ 20v	30	90	5a
2N456B	K(TO-3)	A	7a	150w	1.75w	40v	2 ma, 70°C	30	90	5a
2N457A/USA	K(TO-3)	A	7a	150w	1.75w	60v	.5 ma @ 40v	30	90	5a
2N457B	K(TO-3)	A	7a	150w	1.75w	60v	2 ma, 70°C	30	90	5a
2N458A/USA	K(TO-3)	A	7a	150w	1.75w	80v	.5 ma @ 40v	30	90	5a
2N458B	K(TO-3)	A	7a	150w	1.75w	80v	2 ma, 70°C	30	90	5a
2N511	K(TO-3)	A	25a	150w	1.75w	40v	5 ma	20	60	10a
2N511A	K(TO-3)	A	25a	150w	1.75w	60v	5 ma	20	60	10a
2N511B	K(TO-3)	A	25a	150w	1.75w	80v	5 ma	20	60	10a
2N512	K(TO-3)	A	25a	150w	1.75w	40v	5 ma	20	60	15a
2N512A	K(TO-3)	A	25a	150w	1.75w	60v	5 ma	20	60	15a
2N512B	K(TO-3)	A	25a	150w	1.75w	80v	5 ma	20	60	15a
2N513	K(TO-3)	A	25a	150w	1.75w	40v	5 ma	20	60	20a
2N513A	K(TO-3)	A	25a	150w	1.75w	60v	5 ma	20	60	20a
2N513B	K(TO-3)	A	25a	150w	1.75w	80v	5 ma	20	60	20a
2N514	K(TO-3)	A	25a	150w	1.75w	40v	5 ma	20	60	25a
2N514A	K(TO-3)	A	25a	150w	1.75w	60v	5 ma	20	60	25a
2N514B	K(TO-3)	A	25a	150w	1.75w	80v	5 ma	20	60	25a
TI539	C	A	3.5a	25w	.9w	80v	1 ma	30	75	2a
TI540	C	A	3.5a	25w	.9w	80v	1 ma	45	113	2a
2N1021/USA	K(TO-3)	A	7a	150w	1.75w	100v	.5 ma @ 50v	30	90	5a
2N1021A	K(TO-3)	A	7a	150w	1.75w	100v	2 ma, 70°C	30	90	5a
2N1022/USA	K(TO-3)	A	7a	150w	1.75w	120v	.5 ma @ 60v	30	90	5a
2N1022A	K(TO-3)	A	7a	150w	1.75w	120v	2 ma, 70°C	30	90	5a
2N1038	E	A	3a	20w	.4w	40v	.125 ma @ 20v	20	60	1a
2N1039/JAN	E	A	3a	20w	.4w	60v	.125 ma @ 30v	20	60	1a
2N1040	E	A	3a	20w	.4w	80v	.125 ma @ 40v	20	60	1a
2N1041/JAN	E	A	3a	20w	.4w	100v	.125 ma @ 50v	20	60	1a
2N1042/JAN	B	A	3.5a	20w	1.1w	40v	.125 ma @ 20v	20	60	3a
2N1043/JAN	B	A	3.5a	20w	1.1w	60v	.125 ma @ 30v	20	60	3a
2N1044/JAN	B	A	3.5a	20w	1.1w	80v	.125 ma @ 40v	20	60	3a
2N1045/JAN	B	A	3.5a	20w	1.1w	100v	.125 ma @ 50v	20	60	3a
2N1539	K(TO-3)	A	5a	150w	1.75w	40v	20 ma	50	100	3a
2N1540	K(TO-3)	A	5a	150w	1.75w	60v	20 ma	50	100	3a
2N1541	K(TO-3)	A	5a	150w	1.75w	80v	20 ma	50	100	3a
2N1542	K(TO-3)	A	5a	150w	1.75w	100v	20 ma	50	100	3a
2N1543	K(TO-3)	A	5a	150w	1.75w	120v	20 ma	50	100	3a
2N2552/1038-1	C	A	3a	20w	.9w	40v	.125 ma @ 20v	20	60	1a
JAN2N2553/1039-1	C	A	3a	20w	.9w	60v	.125 ma @ 30v	20	60	1a
2N2554/1040-1	C	A	3a	20w	.9w	80v	.125 ma @ 40v	20	60	1a
JAN2N2555/1041-1	C	A	3a	20w	.9w	100v	.125 ma @ 50v	20	60	1a
2N2556/1038-2	B	A	3a	20w	1.1w	40v	.125 ma @ 20v	20	60	1a
JAN2N2557/1039-2	B	A	3a	20w	1.1w	60v	.125 ma @ 30v	20	60	1a
2N2558/1040-2	B	A	3a	20w	1.1w	80v	.125 ma @ 40v	20	60	1a
JAN 2559/1041-2	B	A	3a	20w	1.1w	100v	.125 ma @ 50v	20	60	1a
2N2560/1042-1	C	A	3.5a	20w	.9w	40v	.125 ma @ 20v	20	60	3a
2N2561/1043-1	C	A	3.5a	20w	.9w	60v	.125 ma @ 30v	20	60	3a
2N2562/1044-1	C	A	3.5a	20w	.9w	80v	.125 ma @ 40v	20	60	3a
2N2563/1045-1	C	A	3.5a	20w	.9w	100v	.125 ma @ 50v	20	60	3a
2N2564/1042-2	E	A	3.5a	20w	.4w	40v	.125 ma @ 20v	20	60	3a
2N2565/1043-2	E	A	3.5a	20w	.4w	60v	.125 ma @ 30v	20	60	3a
2N2566/1044-2	E	A	3.5a	20w	.4w	80v	.125 ma @ 40v	20	60	3a
2N2567/1045-2	E	A	3.5a	20w	.4w	100v	.125 ma @ 50v	20	60	3a
2N2659	E	A	3a	15w	.4w	50v	.125 ma @ 25v	30	90	.5a
2N2660	E	A	3a	15w	.4w	70v	.125 ma @ 35v	30	90	.5a
2N2661	E	A	3a	15w	.4w	90v	.125 ma @ 45v	30	90	.5a
2N2662	C	A	3a	15w	.9w	50v	.125 ma @ 25v	30	90	.5a
2N2663	C	A	3a	15w	.9w	70v	.125 ma @ 35v	30	90	.5a
2N2664	C	A	3a	15w	.9w	90v	.125 ma @ 45v	30	90	.5a
2N2665	E	A	3a	15w	.4w	50v	.125 ma @ 25v	30	90	.5a
2N2666	E	A	3a	15w	.4w	70v	.125 ma @ 35v	30	90	.5a
2N2667	E	A	3a	15w	.4w	90v	.125 ma @ 45v	30	90	.5a
2N2668	C	A	3a	15w	.9w	50v	.125 ma @ 25v	30	90	.5a
2N2669	C	A	3a	15w	.9w	70v	.125 ma @ 35v	30	90	.5a
2N2670	C	A	3a	15w	.9w	90v	.125 ma @ 45v	30	90	.5a
TI3027	K(TO-3)	A	7a	150w	2w	45v	1 ma @ 30v	40	250	3a
TI3028	K(TO-3)	A	7a	150w	2w	60v	1 ma @ 45v	40	250	3a
TI3029	K(TO-3)	A	7a	150w	2w	80v	1 ma @ 50v	30/40	250	5a/3a
TI3030	K(TO-3)	A	7a	150w	2w	100v	1 ma @ 60v	30/40	250	5a/3a
TI3031	K(TO-3)	A	7a	150w	2w	120v	1 ma @ 70v	30/40	90	5a/3a
2N3146	K(TO-3)	A	15a	150w	1.75w	150v	10 ma	25/30	90	10a/5a
2N3147	K(TO-3)	A	15a	150w	1.75w	180v	10 ma	25/30	90	10a/5a

HIGH FREQUENCY — SWITCHING*— POWER

2N1907	K(TO-3)	AD	20a	60w	1.75w	100v	10 ma	30	170	10a
2N1908	K(TO-3)	AD	20a	60w	1.75w	130v	10 ma	30	170	10a
2N1046/USN	K(TO-3)	AD	20a	50w	1.75w	100v	2 ma @ 75v	60	200	5a

* $|h_{fe}|$ @ 10 Mc ≥1
† Unless otherwise noted

SILICON COMPUTER DIODES

Type	Case	$V_{R(max)}$ v	$V_{(BR)}$ v	Max t_{rr} @ 25°C μ sec	Maximum I_R @ 25°C μ a	Maximum I_R @ 100°C μ a	I_F Min Fwd Current @ 1 v ma
1N251	PP	30	40	0.15§	0.1 @ 10 v	10 @ 10 v	5
JAN1N251	PP	30	40	0.15§	0.1 @ 10 v	10 @ 10 v	5
1N625	PP	20	30	1‡	1	30	4†
1N626	PP	35	50	1‡	1	30	4†
1N627	PP	75	100	1‡	1	30	4†
1N628	PP	125	150	1‡	1	30	4†
1N629	PP	175	200	1‡	1	30	4†
1N643	PP	175	200	0.3‖	0 025 @ 10 v 1 @ 100 v	5 @ 10 v 15 @ 100 v	10
1N658	PP	50	120	0.3***	0.05	25 @ 50 v @ 150°C	100
1N659	PP	50	60 @ 100°C	0.3‡	5	25	6
1N660	PP	100	110 @ 100°C	0.3‡	5	50	6
1N661	PP	200	240 @ 100°C	0.3‡	10 1 @ 10 v	100 20 @ 10 v	6
1N662	PP	80	100	0.5¶	20 @ 50 v	100 @ 50 v	10
USA1N662	PP	80	100	0.5¶	20 @ 50 v	100 @ 50 v	10
1N663	PP	80	100	0.5‖	5 @ 75 v	50 @ 75 v	100
USA1N663	PP	80	100	0.5‖	5 @ 75 v	50 @ 75 v	100
1N914	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 150°C @ 20 v	10
JAN1N914	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 150°C @ 20 v	10
1N914A	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	20
1N914B	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	100
1N3064	PP	50	75	0.004*	.01 @ 50 v	100 @ 50 v @ 150°C	10
USN1N3064	PP	50	75	0.004*	.01 @ 50 v	100 @ 50 v @ 150°C	10
1N3070	PP	175	200	0.05‡‡	0.1 @ 175 v	100 @ 175 v @ 150°C	100
USN1N3070	PP	175	200	0.05‡‡	0.1 @ 175 v	100 @ 175 v @ 150°C	100
1N915	PP	50	65	0.010*	0.025 @ 10 v	5 @ 20 v	50
1N916	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	10
1N916A	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	20
1N916B	PP	75	100	0.004**	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	30
1N917	PP	40	50	0.003*	0.05 @ 10 v	25 @ 20 v	10
1N3593(TI-2)	FF	40	50	0.010*	0.025 @ 10 v	50 @ 10 v @ 150°C	10
TI6	FF	20	30	0.100*	1 @ 10 v	100 @ 10 v	5
TI7	FF	30	50	0.01*	0.025 @ 10 v	10 @ 10 v	10
TI8	FF	40	60	0.008*	0.025 @ 10 v	10 @ 10 v	10
TI9	FF	50	70	0.01*	0.025 @ 10 v	10 @ 10 v	10
TI10	FF	60	80	0.008*	0.025 @ 10 v	10 @ 10 v	10
TID11	PP	75	100	0.006††	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	200
TID12	PP	75	100	0.01††	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	200
TID13	PP	50	75	0.01††	5 @ 50 v 0.025 @ 20 v	50 @ 20 v @ 150°C	200
TID14	PP	75	100	0.01††	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	150
TID15	PP	50	75	0.01††	5 @ 50 v 0.025 @ 20 v	50 @ 20 v @ 150°C	150
TID16	PP	75	100	0.01††	5 @ 75 v 0.025 @ 20 v	50 @ 20 v @ 150°C	100
TID17	R	30	60	0.025††	0.1 @ 30 v	——	100
TID18	R	15	30	0.025††	0.1 @ 15 v	——	100 @ 1.1v
TID19	R	30	60	0.025††	0.1 @ 30 v	——	100
TID20	R	15	30	0.025††	0.1 @ 15 v	——	100 @ 1.1v
TIXD21	TT	30	60	0.025††	0.1 @ 30 v	——	100
TIXD22	TT	15	30	0.025††	0.1 @ 15 v	——	100 @ 1.1v
TIXD23	TT	30	60	0.025††	0.1 @ 30 v	——	100
TIXD24	TT	15	30	0.025††	0.1 @ 15 v	——	100 @ 1.1v
TIXD25	TT	30	60	0.025††	0.1 @ 30 v	——	100
TIXD26	TT	15	30	0.025††	0.1 @ 15 v	——	100 @ 1.1v

* Lumatron (10 ma I_F, switched to 10 ma I_R, recovery to 1 ma)
† E_b equals 1.5 v
‡ 256 JAN (30 ma I_F, switched to 35 v V_R, recovery to 400 kilohms)
§ 256 JAN (5 ma I_F, switched to 10 v V_R, recovery to 20 kilohms)
‖ 256 JAN (5 ma I_F, switched to 40 v V_R, recovery to 200 kilohms)
¶ 256 JAN (5 ma I_F, switched to 40 v V_R, recovery to 100 kilohms)
** EGG Type 2236A (10 ma I_F, switched to 6 v V_R, recovery to 1 ma reverse)
†† $I_F = I_R = 200$ ma, recovery to 20 ma, $R_L = 100$ ohms
‡‡ Lumatron (30 ma I_F, switched to 30 ma I_R, recovery to 1 ma)
*** JAN256 5 ma I_F, −40 v V_R, recovery to 80 kilohms.

SILICON COMPUTER DIODES (Continued)

Type	Case	$V_{R(max)}$ v	$V_{(BR)}$ v	Max t_{rr} @ 25°C μ sec	Maximum I_R @ 25°C μ a	Maximum I_R @ 100°C μ a	I_F Min Fwd Current @ 1 v ma
TI71	PP		40	0.010*	1 @ 20 v		6
TI72	PP		40	0.020*	1 @ 20 v		10
TI73	PP		40	0.020*	1 @ 20 v		20
TI74	PP		40	0.030*	1 @ 15 v		30
TI75	PP		40	0.050*	5 @ 35 v		75
TI251	FF	30	40	0.15§	0.1 @ 10 v	10 @ 10 v @ 125°C	5
TI252	FF	50	60	0.3‡	5	25	6
TI253	FF	100	120	0.3‡	5 @ 75 v	50	6
TI254	FF	75	100	0.004**	0.025 @ 20 v 5 @ 75 v	50 @ 20 v @ 150°C	10
TI255	FF	75	100	0.004**	0.025 @ 20 v 5 @ 75 v	50 @ 20 v @ 150°C	20
TI256	FF	75	100	0.004**	0.025 @ 20 v 5 @ 75 v	50 @ 20 v @ 150°C	10
TI257	FF	75	100	0.004**	0.025 @ 20 v 5 @ 75	50 @ 20 v @ 150°C	20

GENERAL PURPOSE SILICON DIODES

Type	Case	$V_{R(max)}$	$V_{(BR)}$ I_R = 100 μa v	Min DC FWD I @25°C ma @ 1v	Maximum IR @ $V_{R(max)}$ @25°C μa	Maximum IR @ $V_{R(max)}$ @150°C μa	P @ 25°C mw
1N456	MM	25	30	40	0.025	5	500
1N456A	MM	25	30	100	0.025	5	500
1N457	MM	60	70	20	0.025	5	500
1N457A	MM	60	70	100	0.025	5	500
JAN1N457	MM	60	70	20	0.025	5	500
1N458	MM	125	150	7	0.025	5	500
1N458A	MM	125	150	100	0.025	5	500
JAN1N458	MM	125	150	7	0.025	5	500
1N459	MM	175	200	3	0.025	5	500
1N459A	MM	175	200	100	0.025	5	500
JAN1N459	MM	175	200	3	0.025	5	500
1N461	MM	25	30	15	0.5	30	200
1N461A	MM	25	30	100	0.5	30	200
1N462	MM	60	70	5	0.5	30	200
1N463	MM	175	200	1	0.5	30	200
1N464	MM	125	150	3	0.5	30	200
1N482	MM	30	40	100*	0.25	30	500
1N482A	MM	30	40	200	0.025	15	500
1N482B	MM	30	40	200	0.025	5	500
1N483	MM	60	80	100*	0.25	30	500
1N483A	MM	60	80	200	0.025	15	500
1N483B	MM	60	80	200	0.025	5	500
USN1N483B	MM	60	80	200	0.025	5	500
1N484	MM	125	150	100*	0.25	30	500
1N484A	MM	125	150	200	0.025	15	500
1N484B	MM	125	150	200	0.025	5	500
1N485	MM	75	200	100*	0.25	30	500
1N485A	MM	175	200	200	0.025	15	500
1N485B	MM	175	200	200	0.025	5	500
USN1N485B	MM	175	200	200	0.025	5	500
1N486	MM	225	250	100*	0.25	50	500
1N486A	MM	225	250	200	0.025	25	500
1N486B	MM	225	250	200	0.05	10	500
USN1N486B	MM	225	250	200	0.05	10	500
1N487	MM	300	330	100*	0.25	50	500
1N487A	MM	300	330	200	0.025	25	500
1N488	MM	300	420	100*	0.25	50	500
1N488A	MM	380	420	200	0.025	25	500
600	NN	27	30	3	1 @ 10 v	20 @ 10 v‡	150
601	NN	45	50	10	0.025 @ 10 v	40 @ 10 v	150
604	NN	4.7	5.5	60	0.1	40	150
606	NN	6.8	7.5	35	0.1	40	150
608	NN	10	11	25	0.1	40	150
610	NN	15	17	20	0.1	40	150
612	NN	22	25	20	0.1	40	150
614	NN	33	37	10	0.1	40	150
616	NN	47	52	10	0.2	40	150
618	NN	68	75	10	0.2	40	150
620	NN	100	100	10	0.2	40	150
622	NN	150	170	7	0.2	20‡	150
624	NN	220	250	3	0.2	20‡	150
1N645	MM	225	275	400	0.2	15	600
AF1N645	MM	225	275	400	0.2	15	600
JAN1N645	MM	225	275	400	0.2	15	600
1N645A	MM	225	275	400	0.2	15	600
1N646	MM	300	360	400	0.2	15	600
AF1N646	MM	300	360	400	0.2	15	600
1N647	MM	400	480	400	0.2	20	600
AF1N647	MM	400	480	400	0.2	20	600
1N648	MM	500	600	400	0.2	20	600
AF1N648	MM	500	600	400	0.2	20	600
1N649	MM	600	720	400	0.2	25	600
AF1N649	MM	600	720	400	0.2	25	600

*Measured at 1.1 v
‡at 100°C

SILICON RADIATION-TOLERANT DIODES

Type	Case	V_R rating v	$V_{(BR)}$	C§ At 0 v pf	Max I_R, μa At 25° C	Max I_R, μa At 100° C	Min I_{Eff} At V_R	Min I_{Eff} At 1 v ma
TI 550	PP	175	200	20	0.1	10	175	100
TI 551	PP	175	290	20	0.1	10	225	100

§Junction capacitance, measured parallel.

SILICON POWER REGULATORS

Type	Case	Vz Zener Voltage Nominal v	I_{ZT} ma	Max Zz @ Iz @ 25°C ohms
10-watt, Double-Anode				
1N1816†	II (DO-4)	13	500	2
1N1817†	II (DO-4)	15	500	2
1N1818†	II (DO-4)	16	500	3
1N1819†	II (DO-4)	18	500	3
1N1820†	II (DO-4)	20	250	3
1N1821†	II (DO-4)	22	250	3
1N1822†	II (DO-4)	24	250	3
1N1823†	II (DO-4)	27	250	3
1N1824†	II (DO-4)	30	250	4
1N1825†	II (DO-4)	33	150	4
1N1826†	II (DO-4)	36	150	5
1N1827†	II (DO-4)	39	150	5
1N1828†	II (DO-4)	43	150	6
1N1829†	II (DO-4)	47	150	7
1N1830†	II (DO-4)	51	150	8
1N1831†	II (DO-4)	56	150	9
1N1832†	II (DO-4)	62	50	12
1N1833†	II (DO-4)	68	50	14
1N1834†	II (DO-4)	75	50	20
1N1835†	II (DO-4)	82	50	22
1N1836†	II (DO-4)	91	50	35
1N2008*	II (DO-4)	100	50	40
1N2009*	II (DO-4)	110	50	47
1N2010*	II (DO-4)	120	50	56
1N2011*	II (DO-4)	130	50	65
1N2012*	II (DO-4)	150	50	82
1N2498†	II (DO-4)	10	500	2
1N2499†	II (DO-4)	11	500	2
1N2500†	II (DO-4)	12	500	2
10-watt, Single-Anode				
1N2970‡	II (DO-4)	6.8	370	1.2
1N2971‡	II (DO-4)	7.5	335	1.3
1N2972‡	II (DO-4)	8.2	305	1.5
1N2973‡	II (DO-4)	9.1	275	2.0
1N2974‡	II (DO-4)	10	250	3.0
1N2975‡	II (DO-4)	11	230	3.0
1N2976‡	II (DO-4)	12	210	3.0
1N2977‡	II (DO-4)	13	190	3.0
1N2979‡	II (DO-4)	15	170	3.0
1N2980‡	II (DO-4)	16	155	4.0
1N2982‡	II (DO-4)	18	140	4.0
1N2984‡	II (DO-4)	20	125	4.0
1N2985‡	II (DO-4)	22	115	5.0
1N2986‡	II (DO-4)	24	105	5.0
1N2988‡	II (DO-4)	27	95	7.0
1N2989‡	II (DO-4)	30	85	8.0
1N2990‡	II (DO-4)	33	75	9.0
1N2991‡	II (DO-4)	36	70	10
1N2992‡	II (DO-4)	39	65	11
1N2993‡	II (DO-4)	43	60	12
1N2995‡	II (DO-4)	47	55	14
1N2997‡	II (DO-4)	51	50	15
1N2999‡	II (DO-4)	56	45	16
1N3000‡	II (DO-4)	62	40	17
1N3001‡	II (DO-4)	68	37	18
1N3002‡	II (DO-4)	75	33	22
1N3003‡	II (DO-4)	82	30	25
1N3004‡	II (DO-4)	91	28	35
1N3005‡	II (DO-4)	100	25	40
1N3007‡	II (DO-4)	110	23	55
1N3008‡	II (DO-4)	120	20	75
1N3009‡	II (DO-4)	130	19	100
1N3011‡	II (DO-4)	150	17	175
1N3012‡	II (DO-4)	160	16	200
1N3014‡	II (DO-4)	180	14	260
1N3015‡	II (DO-4)	200	12	300
1-watt, Single-Anode				
1N3016‡	HH	6.8	37	3.5
1N3017‡	HH	7.5	34	4.0
1N3018‡	HH	8.2	31	4.5
1N3019‡	HH	9.1	28	5.0
1N3020‡	HH	10	25	7.0
1N3021‡	HH	11	23	8.0
1N3022‡	HH	12	21	9.0
1N3023‡	HH	13	19	10.0
1N3024‡	HH	15	17	14.0
1N3025‡	HH	16	15.5	16.0
1N3026‡	HH	18	14.0	20.0
1N3027‡	HH	20	12.5	22.0
1N3028‡	HH	22	11.5	23.0
1N3029‡	HH	24	10.5	25.0
1N3030‡	HH	27	9.5	35.0
1N3031‡	HH	30	8.5	40.0
1N3032‡	HH	33	7.5	45.0
1N3033‡	HH	36	7.0	50.0
1N3034‡	HH	39	6.5	60.0
1N3035‡	HH	43	6.0	70.0
1N3036‡	HH	47	5.5	80.0
1N3037‡	HH	51	5.0	95.0
1N3038‡	HH	56	4.5	110.0
1N3039‡	HH	62	4.0	125
1N3040‡	HH	68	3.7	150
1N3041‡	HH	75	3.3	175
1N3042‡	HH	82	3.0	200
1N3043‡	HH	91	2.8	250
1N3044‡	HH	100	2.5	350
1N3045‡	HH	110	2.3	450

*± 10% tolerance.

† No suffix: ±10% tolerance. Suffix "A": ±5% tolerance.

‡ No suffix: ±20% tolerance. Suffix "A": ±10%. Suffix "B": ±5%.

Also available: USN 1N1816 through USN 1N1836 (A & RA) (MIL-E-1/1259), USN 1N3016B through USN 1N3043B (MIL-S-19500/115D), and JAN 1N2970B through JAN 1N2990B (MIL-S-19500/124C).

Add suffix "R" to type number for reverse polarity.

SILICON POWER REGULATORS

Type	Case	Vz Zener Voltage Nominal v	Izt ma	Max Zz @ Iz @ 25°C ohms
1-watt, Single-Anode (Cont'd.)				
1N3046‡	HH	120	2.0	550
1N3047‡	HH	130	1.9	700
1N3048‡	HH	150	1.7	1000
1N3049‡	HH	160	1.6	1100
1N3050‡	HH	180	1.4	1200
1N3051‡	HH	200	1.2	1500
1N4158‡	FFF	6.8	37	3.5
1N4159‡	FFF	7.5	34	4.0
1N4160‡	FFF	8.2	31	4.5
1N4161‡	FFF	9.1	28	5.0
1N4162‡	FFF	10	25	7
1N4163‡	FFF	11	23	8
1N4164‡	FFF	12	21	9
1N4165‡	FFF	13	19	10
1N4166‡	FFF	15	17	14
1N4167‡	FFF	16	15.5	16
1N4168‡	FFF	18	14	20
1N4169‡	FFF	20	12.5	22
1N4170‡	FFF	22	11.5	23
1N4171‡	FFF	24	10.0	25
1N4172‡	FFF	27	9.5	35
1N4173‡	FFF	30	8.5	40
1N4174‡	FFF	33	7.5	45
1N4175‡	FFF	36	7.0	50
1N4176‡	FFF	39	6.5	60
1N4177‡	FFF	43	6.0	70
1N4178‡	FFF	47	5.5	80
1N4179‡	FFF	51	5.0	95
1N4180‡	FFF	56	4.5	110
1N4181‡	FFF	62	4.0	125
1N4182‡	FFF	68	3.7	150
1N4183‡	FFF	75	3.3	175
1N4184‡	FFF	82	3.0	200
1N4185‡	FFF	91	2.8	250
1N4186‡	FFF	100	2.5	350
1N4187‡	FFF	110	2.3	450
1N4188‡	FFF	120	2.0	550
1N4189‡	FFF	130	1.9	700
1N4190‡	FFF	150	1.7	1000
1N4191‡	FFF	160	1.6	1100
1N4192‡	FFF	180	1.4	1200
1N4193‡	FFF	200	1.2	1500

Type	Case	Vz Zener Voltage Nominal v	Izt ma	Max Zz @ Iz @ 25°C ohms
1-watt, Double-Anode				
1N4831‡	FFF	9.1	28	8
1N4832‡	FFF	10	25	9
1N4833‡	FFF	11	23	10
1N4834‡	FFF	12	21	12
1N4835‡	FFF	13	19	15
1N4836‡	FFF	15	17	17
1N4837‡	FFF	16	16	19
1N4838‡	FFF	18	14	20
1N4839‡	FFF	20	12.5	22
1N4840‡	FFF	22	11.3	23
1N4841‡	FFF	24	10.5	25
1N4842‡	FFF	27	9.3	35
1N4843‡	FFF	30	8.3	40
1N4844‡	FFF	33	7.5	45
1N4845‡	FFF	36	7.0	50
1N4846‡	FFF	39	6.5	60
1N4847‡	FFF	43	5.8	70
1N4848‡	FFF	47	5.3	80
1N4849‡	FFF	51	5.0	95
1N4850‡	FFF	56	4.5	110
1N4851‡	FFF	62	4.0	125
1N4852‡	FFF	68	3.7	150
1N4853‡	FFF	75	3.3	175
1N4854‡	FFF	82	3.0	200
1N4855‡	FFF	91	2.8	250
1N4856‡	FFF	100	2.5	350
1N4857‡	FFF	110	2.3	450
1N4858‡	FFF	120	2.1	550
1N4859‡	FFF	130	1.9	700
1N4860‡	FFF	150	1.7	1000

‡ No suffix: ±20% tolerance. Suffix "A": ±10%. Suffix "B": ±5%.

SILICON VOLTAGE REGULATOR DIODES

Type	Case	$V_{(BR)}$@ $I_{(BR)T}$* Zener Breakdown Voltage volts	$Z_{(BR)}$@ $I_{(BR)T}$* Small-signal Zener Impedance ohms	$V_{R(1)}$* Static Reverse Current μa	P Power Dissipation @ 25° C watts
1N702†	MM	2.0-3.2	60	75	400
1N703†	MM	3.0-3.9	55	50	400
1N704†	MM	3.7-4.5	45	5	400
1N705†	MM	4.3-5.4	35	5	400
1N706†	MM	5.2-6.4	20	5	400
1N707†	MM	6.2-8.0	10	5	400
1N709†	MM	6.2	4.1		400
1N710†	MM	6.8	4.7		400
1N711†	MM	7.5	5.2		400
1N712†	MM	8.2	6.0		400
1N713†	MM	9.1	7.0		400
1N714†	MM	10.0	8.0		400
1N715†	MM	11.0	9.0		400
1N716†	MM	12.0	10.0		400
1N717†	MM	13.0	11.0		400

*See TI Data Sheets for $I_{(BR)T}$ and $V_{R(1)}$.
†On types 1N702 — **1N737**, 1N746 — 1N759, and 1N4370 — 1N4372, add an "A" suffix for 5% devices.
‡Types 1N3506 — 1N3530 and 1N4099 — 1N4106 are 5% devices.
§On types 1N957 — **1N984** add an "A" suffix for 10% devices and a "B" suffix for 5% devices.
‖Noise less than 40 μv (cps)½, (f_c = 2 Kc, BW = 2 Kc, I_R = 250 μa.
¶Types 1N746A through 1N759A and 1N4370A through 1N4372A are available to meet MIL-S-19500-127C (Navy) and are available with USN prefix.

SILICON VOLTAGE REGULATOR DIODES

Type	Case	$V_{(BR)}$@ $I_{(BR)T}$* Zener Breakdown Voltage volts	$Z_{(BR)T}$@ $I_{(BR)T}$* Small-signal Zener Impedance ohms	$V_{R(1)}$* Static Reverse Current μa	P Power Dissipation @ 25° C watts
1N718†	MM	15.0	13.0		400
1N719†	MM	16.0	15.0		400
1N720†	MM	18.0	17.0		400
1N721†	MM	20.0	20.0		400
1N722†	MM	22.0	24.0		400
1N723†	MM	24.0	28.0		400
1N724†	MM	27.0	35.0		400
1N725†	MM	30.0	42.0		400
1N726†	MM	33.0	50.0		400
1N727†	MM	36	60		400
1N728†	MM	39	70		400
1N729†	MM	43	84		400
1N730†	MM	47	98		400
1N731†	MM	51	115		400
1N732†	MM	56	140		400
1N733†	MM	62	170		400
1N734†	MM	68	200		400
1N735†	MM	75	240		400
1N736†	MM	82	280		400
1N737†	MM	91	340		400
1N746†¶	MM	3.3	28	10	400
1N747†¶	MM	3.6	24	10	400
1N748†¶	MM	3.9	23	10	400
1N749†¶	MM	4.3	22	2	400
1N750†¶	MM	4.7	19	2	400
1N751†¶	MM	5.1	17	1	400
1N752†¶	MM	5.6	11	1	400
1N753†¶	MM	6.2	7	0.1	400
1N754†¶	MM	6.8	5	0.1	400
1N755†¶	MM	7.5	6	0.1	400
1N756†¶	MM	8.2	8	0.1	400
1N757†¶	MM	9.1	10	0.1	400
1N758†¶	MM	10.1	17	0.1	400
1N759†¶	MM	12.0	30	0.1	400
1N761	MM	4.3- 5.4	55		400
1N762	MM	5.2- 6.4	20		400
1N763	MM	6.2- 8.0	8		400
1N764	MM	7.5-10.0	15		400
1N765	MM	9.0-12.0	50		400
1N766	MM	11.0-14.0	70		400
1N767	MM	13.5-18	120		400
1N768	MM	17-21	200		400
1N769	MM	20-27	300		400
1N957§	MM	6.8	4.5	150	400
1N958§	MM	7.5	5.5	75	400
1N959§	MM	8.2	6.5	50	400
1N960§	MM	9.1	7.5	25	400
1N961§	MM	10	8.5	10	400
1N962§	MM	11	9.5	5	400
1N963§	MM	12	11.5	5	400
1N964§	MM	13	13	5	400
1N965§	MM	15	16	5	400
1N966§	MM	16	17	5	400
1N967§	MM	18	21	5	400
1N968§	MM	20	25	5	400
1N969§	MM	22	29	5	400
1N970§	MM	24	33	5	400
1N971§	MM	27	41	5	400
1N972§	MM	30	49	5	400
1N973§	MM	33	58	5	400
1N974§	MM	36	70	25.9	400
1N975§	MM	39	80	29.7	400
1N976§	MM	43	93	32.7	400
1N977§	MM	47	105	35.8	400
1N978§	MM	51	125	38.8	400
1N979§	MM	56	150	42.6	400
1N980§	MM	62	185	47.1	400
1N981§	MM	68	230	91.2	400
1N982§	MM	75	270	98.8	400
1N983§	MM	82	330	114.0	400
1N984§	MM	91	400	121.6	400
1N3506‡	MM	3.3	24	4	400
1N3507‡	MM	3.6	22	2	400
1N3508‡	MM	3.9	20	0.4	400
1N3509‡	MM	4.3	18	0.1	400
1N3510‡	MM	4.7	16	5	400
1N3511‡	MM	5.1	14	2	400
1N3512‡	MM	5.6	8	5	400
1N3513‡	MM	6.2	3	5	400

SILICON VOLTAGE REGULATOR DIODES

Type	Case	$V_{(BR)}$@ $I_{(BR)T}$* Zener Breakdown Voltage volts	$Z_{(BR)T}$@ $I_{(BR)T}$* Small-signal Zener Impedance ohms	$V_{R(1)}$* Static Reverse Current μa	P Power Dissipation @ 25° C watts
1N3515‡	MM	7.5	4	0.5	400
1N3516‡	MM	8.2	5	0.25	400
1N3517‡	MM	9.1	6	0.025	400
1N3518‡	MM	10	7	0.01	400
1N3519‡	MM	11	8	0.01	400
1N3520‡	MM	12	10	0.01	400
1N3521‡	MM	13	12	0.01	400
1N3522‡	MM	15	14	0.01	400
1N3523‡	MM	16	16	0.01	400
1N3524‡	MM	18	18	0.01	400
1N3535‡	MM	20	20	0.01	400
1N3526‡	MM	22	35	0.01	400
1N3527‡	MM	24	38	0.01	400
1N3528‡	MM	27	40	0.01	400
1N3529‡	MM	30	48	0.01	400
1N3530‡	MM	33	50	0.01	400
1N3531‡	MM	36	75	0.010	400
1N3532‡	MM	39	100	0.010	400
1N3533‡	MM	43	130	0.010	400
1N3534‡	MM	47	150	0.010	400
1N4099‡‖	MM	6.8	200	10	400
1N4100‡‖	MM	7.5	200	10	400
1N4101‡‖	MM	8.2	200	1	400
1N4102‡‖	MM	8.7	200	1	400
1N4103‡‖	MM	9.1	200	1	400
1N4104‡‖	MM	10	200	1	400
1N4105‡‖	MM	11	200	.05	400
1N4106‡‖	MM	12	200	.05	400
1N4360	MM	2.28-2.52	60	75	400
1N4370†	MM	2.4	30	100	400
1N4371†	MM	2.7	30	75	400
1N4372†	MM	3.0	30	50	400
650	NN	3.7-4.5		0.1	150
651	NN	4.3-5.4		0.1	150
652	NN	5.2-6.4		0.1	150
653	NN	6.2-8.0		0.1	150
650C0	NN	3.7		0.15	150
650C1	NN	3.8		0.15	150
650C2	NN	3.9		0.1	150
650C3	NN	4.0		0.1	150
650C4	NN	4.1		0.1	150
650C5	NN	4.2		0.1	150
650C6	NN	4.3		0.1	150
650C7	NN	4.4		0.1	150
651C0	NN	4.5		0.1	150
651C1	NN	4.6		0.1	150
651C2	NN	4.7		0.1	150
651C3	NN	4.8		0.1	150
651C4	NN	4.9		0.1	150
651C5	NN	5.0		0.1	150
651C6	NN	5.1		0.1	150
651C7	NN	5.2		0.1	150
651C8	NN	5.3		0.1	150
651C9	NN	5.4		0.1	150
652C0	NN	5.5		0.1	150
652C1	NN	5.6		0.1	150
652C2	NN	5.7		0.1	150
652C3	NN	5.8		0.1	150
652C4	NN	5.9		0.1	150
652C5	NN	6.0		0.1	150
652C6	NN	6.1		0.1	150
652C7	NN	6.2		0.1	150
652C8	NN	6.3		0.1	150
652C9	NN	6.4		0.1	150
653C0	NN	6.5		0.1	150
653C1	NN	6.6		0.1	150
653C2	NN	6.7		0.1	150
653C3	NN	6.8		0.1	150
653C4	NN	7.0		0.1	150
653C5	NN	7.2		0.1	150
653C6	NN	7.4		0.1	150
653C7	NN	7.6		0.1	150
653C8	NN	7.8		.01	150
653C9	NN	8.0		.01	150
654C9	NN	8.5- 9.5		.01	150
655C9	NN	9.5-10.5		.01	150

*See TI Data Sheets for $I_{(BR)T}$ and $V_{R(1)}$.
†On types 1N702 — 1N737, 1N746 — 1N759, and 1N4370 — 1N4372, add an "A" suffix for 5% devices.
‡Types 1N3506 — 1N3530 and 1N4099 — 1N4106 are 5% devices.
§On types 1N957 — 1N984 add an "A" suffix for 10% devices and a "B" suffix for 5% devices.
‖Noise less than 40 μv (cps)½, (f_c = 2 Kc, BW = 2 Kc, I_R = 250 μa.
¶Types 1N746A through 1N759A available to meet MIL-S-19500-127C (Navy) and are available with USN prefix.

GALLIUM ARSENIDE VARACTOR DIODES

Minimum $V_{(BR)}$ = 8 volts: capacitance, 0.45 to 1.0 pf

Type	Case	Mfg Process	$V_{(BR)}$ v	Capacitance pf Min @ V_R = O v	Capacitance pf Max @ V_R = O v	Min Quality Factor @ V_R = 2 v	Min Cutoff Frequency @ V_R = 2 v Gc
A-610	SS	Diff Ga As	8	0.45	1.0	30	90
A-611	SS	Diff Ga As	8	0.45	1.0	40	120
A-612	SS	Diff Ga As	8	0.45	1.0	50	150
XD-500	EE	Diff Ga As	6	0.5	1.4	20	60
XD-501	EE	Diff Ga As	6	0.5	1.4	27	81
XD-502	EE	Diff Ga As	6	0.5	1.4	36	108
TIV01	SS	Diff Ga As	6	.35	1.0	33	100
TIV02	SS	Diff Ga As	6	.35	.70	50	150
TIV03	SS	Diff Ga As	6	.35	.60	66	200
TIV04	SS	Diff Ga As	6	.35	.60	100	300

Type	Case	Mfg Process	$V_{(BR)}$ @ I_R = 1 μa v	Total Capacitance* pf Min @ V_R = 6 v f = 1 Mc	Total Capacitance* pf Max @ V_R = 6 v f = 1 Mc	Min Cutoff Frequency† @ V_R = 6 v Gc
A900	Pill-prong	Epitax Ga As	30	0.4	1.4	50
A901	Pill-prong	Epitax Ga As	30	0.4	1.4	100
A902	Pill-prong	Epitax Ga As	30	0.4	1.4	200
A903	Pill-prong	Epitax Ga As	30	0.4	1.4	300
A905	Pill-prong	Epitax Ga As	50	0.4	1.4	50
A906	Pill-prong	Epitax Ga As	50	0.4	1.4	100
A907	Pill-prong	Epitax Ga As	50	0.4	1.4	200
A908	Pill-prong	Epitax Ga As	50	0.4	1.4	300

* Total capacitance comprises junction capacitance plus leakage capacitance. Package capacitance is typically 0.33 pf. Typical package inductance is 0.4 nh.

† Cutoff frequency is defined by $f = f_m Q$, where measurement frequency f_m = 3 Gc. Q is determined from VSWR measurements at V_R = 6 v, and is defined by $Q = \frac{X_c}{R_s}$.

SILICON VOLTAGE-VARIABLE-CAPACITANCE DIODES

Type	Case	Mfg Process	@ V_R = 4 v C_T pf	@ V_R = 4 v Q*	$V_{(BR)}$ v
A-580	MM	Si epitax	22	60	35
A-581	MM	Si epitax	22	100	60
A-582	MM	Si epitax	27	60	35
A-583	MM	Si epitax	27	100	60
A-584	MM	Si epitax	33	60	35
A-585	MM	Si epitax	33	100	60
A-586	MM	Si epitax	39	60	35
A-587	MM	Si epitax	39	100	60
A-588	MM	Si epitax	47	60	35
A-589	MM	Si epitax	47	100	60
TIV300	PP	Si diff	7	200	15
TIV301	PP	Si diff	12	120	15
TIV302	PP	Si diff	20	120	15
TIV303	PP	Si diff	33	120	15

*Frequency of 50 Mc.

SILICON CONTROLLED RECTIFIERS

Type	Case	I_o Avg. Rect. Forward Current a	Working Volts (max) Fwd.-Rev.	I_{gt} Gate Current to Trigger @ 25°C ma (max)
TIC01	HHH	70	400	125
TIC02	HHH	70	600	125
TIC03	HHH	70	800	125
TIC04	HHH	70	1000	125
TIC05	HHH	70	1200	125
TIC11	K (TO-3)	5 d-c	100	300
TIC12	K (TO-3)	5 d-c	200	300
TIC13	K (TO-3)	5 d-c	300	300
TIC14	K (TO-3)	5 d-c	400	300
TIC15	K (TO-3)	5 d-c	500	300
TIC20	III	6	200	± 50
TIC21	III	6	300	± 50
TIC22	III**	6	200	± 50
TIC23	III**	6	300	± 50
TI140A0	AA (TO-64)	5	50	25
TI140A1	AA (TO-64)	5	100	25
TI140A2	AA (TO-64)	5	200	25
TI140A3	AA (TO-64)	5	300	25
TI140A4	AA (TO-64)	5	400	25
TIX95	III	12	500	40
TI140A0	RR	0.75	50	25
TI140A1	RR	0.75	100	25
TI140A2	RR	0.75	200	25
TI140A3	RR	0.75	300	25
TI140A4	RR	0.75	400	25
TI145A0	I (TO-5)	0.56	50	25
TI145A1	I (TO-5)	0.56	100	25
TI145A2	I (TO-5)	0.56	200	25
TI145A3	I (TO-5)	0.56	300	25
TI145A4	I (TO-5)	0.56	400	25
W463A	R (TO-18)	0.35	15	2.0
W463B	R (TO-18)	0.35	30	2.0
W463C	R (TO-18)	0.35	60	2.0
W463D	R (TO-18)	0.35	100	2.0
W463E	R (TO-18)	0.35	150	2.0
W463F	R (TO-18)	0.35	200	2.0
2N681	OO	16	25	40
2N681A	OO	18	25	40
2N682	OO	16	50	40
2N682A	OO	18	50	40
2N683	OO	16	100	40
2N683A	OO	18	100	40
2N684	OO	16	150	40
2N684A	OO	18	150	40
2N685	OO	16	200	40
2N685A	OO	18	200	40
2N686	OO	16	250	40
2N686A	OO	18	250	40
2N687	OO	16	300	40
2N687A	OO	18	300	40
2N688	OO	16	400	40
2N688A	OO	18	400	40
2N689	OO	16	500	40
2N689A	OO	18	500	40
2N876	R (TO-18)	0.20	15	0.2
2N877	R (TO-18)	0.20	30	0.2
2N878	R (TO-18)	0.20	60	0.2
2N879	R (TO-18)	0.20	100	0.2
2N880	R (TO-18)	0.20	150	0.2
2N881	R (TO-18)	0.20	200	0.2
2N884	R (TO-18)	0.20	15	0.02
2N885	R (TO-18)	0.20	30	0.02
2N886	R (TO-18)	0.20	60	0.02
2N887	R (TO-18)	0.20	100	0.02
2N888	R (TO-18)	0.20	150	0.02
2N889	R (TO-18)	0.20	200	0.02
2N1595	I (TO-5)	1	50	10
2N1596	I (TO-5)	1	100	10
2N1597	I (TO-5)	1	200	10
2N1598	I (TO-5)	1	300	10
2N1599	I (TO-5)	1	400	10
2N1600	AA (TO-64)	3	50	10
2N1601	AA (TO-64)	3	100	10
2N1602	AA (TO-64)	3	200	10
2N1603	AA (TO-64)	3	300	10
2N1604	AA (TO-64)	3	400	10
2N1770	AA (TO-64)	4.7	25	15
2N1770A	AA (TO-64)	4.7	25	15
2N1771	AA (TO-64)	4.7	50	15
2N1771A	AA (TO-64)	4.7	50	15
2N1772	AA (TO-64)	4.7	100	15
2N1772A	AA (TO-64)	4.7	100	15
2N1773	AA (TO-64)	4.7	150	15
2N1773A	AA (TO-64)	4.7	150	15
2N1774	AA (TO-64)	4.7	200	15
2N1774A	AA (TO-64)	4.7	200	15
2N1775	AA (TO-64)	4.7	250	15
2N1775A	AA (TO-64)	4.7	250	15
2N1776	AA (TO-64)	4.7	300	15
2N1776A	AA (TO-64)	4.7	300	15
2N1777	AA (TO-64)	4.7	400	15
2N1777A	AA (TO-64)	4.7	400	15
2N1778	AA (TO-64)	4.7	500	15
2N1778A	AA (TO-64)	4.7	500	15
2N1842	OO	6.5	25	80
2N1842A	OO	10	25	80
2N1842B	OO	16	25	75
2N1843	OO	6.5	50	80
2N1843A	OO	10	50	80
2N1843B	OO	16	50	75
2N1844	OO	6.5	100	80
2N1844A	OO	10	100	80
2N1844B	OO	16	100	75
2N1845	OO	6.5	150	80
2N1845A	OO	10	150	80
2N1845B	OO	16	150	75
2N1846	OO	6.5	200	80
2N1846A	OO	10	200	80
2N1846B	OO	16	200	75
2N1847	OO	6.5	250	80
2N1847A	OO	10	250	80
2N1847B	OO	16	250	75
2N1848	OO	6.5	300	80
2N1848A	OO	10	300	80
2N1848B	OO	16	300	75
2N1849	OO	6.5	400	80
2N1849A	OO	10	400	80
2N1849B	OO	16	400	75
2N1850	OO	6.5	500	80
2N1850A	OO	10	500	80
2N1850B	OO	16	500	75
2N1929	RR	0.850	25	15
2N1930	RR	0.850	50	15
2N1931	RR	0.850	100	15
2N1932	RR	0.850	150	15
2N1933	RR	0.850	200	15
2N1934	RR	0.850	250	15
2N1935	RR	0.850	300	15
2N2653	AA	140*	400	15
2N2679	R (TO-18)	0.35	30	0.02
2N2680	R (TO-18)	0.35	60	0.02
2N2681	R (TO-18)	0.35	100	0.02
2N2682	R (TO-18)	0.35	200	0.02
2N2683	R (TO-18)	0.28	30	0.02
2N2684	R (TO-18)	0.28	60	0.02
2N2685	R (TO-18)	0.28	100	0.02
2N2686	R (TO-18)	0.28	200	0.02
2N2687	R (TO-18)	0.28	30	0.20
2N2688	R (TO-18)	0.28	60	0.20
2N2689	R (TO-18)	0.28	100	0.20
2N2690	R (TO-18)	0.28	200	0.20
2N3001	R (TO-18)	0.250	30	0.02
2N3002	R (TO-18)	0.250	60	0.02
2N3003	R (TO-18)	0.250	100	0.02
2N3004	R (TO-18)	0.250	200	0.02
2N3005	R (TO-18)	0.250	30	0.20
2N3006	R (TO-18)	0.250	60	0.20
2N3007	R (TO-18)	0.250	100	0.20
2N3008	R (TO-18)	0.250	200	0.20
TI3010	JJJ	5	50	25
TI3011	JJJ	5	100	25
TI3012	JJJ	5	200	25
TI3013	JJJ	5	300	25
TI3014	JJJ	5	400	25
TI3037	OO	18	50	100
TI3038	OO	18	100	100
TI3039	OO	18	200	100
TI3040	OO	18	300	100
TI3041	OO	18	400	100
TI3042	OO	18	500	100
2N3555	I (TO-5)	1	30	0.02
2N3556	I (TO-5)	1	60	0.02
2N3557	I (TO-5)	1	100	0.02
2N3558	I (TO-5)	1	200	0.02
2N3559	I (TO-5)	1	30	0.20
2N3560	I (TO-5)	1	60	0.20
2N3561	I (TO-5)	1	100	0.20
2N3562	I (TO-5)	1	200	0.20

*8-μsec pulse; duty cycle not to exceed .01

** pressed into 1/4" stud

SCR TRIGGER DIODES

Type	Case	Avg. Pwr.	I_{PK}‡	$V_{(BR)R}$§	$V_{(BR)F}$	△V @ 2 ma #	Current at Trigger v
TI42	PP	100 mw	1 a		32 v ± 4 v	4 v	300 μa Max
TI43†	PP	100 mw	1 a	32 v ± 4 v	32 v ± 4 v	4 v	300 μa Max

† symmetrical trigger

‡ for 10-μsec duration

§ reverse breakover voltage; $|V_{(BR)R}| = V_{(BR)F} \pm 2$ v

down voltage; $\triangle V = V_{(BR)F} - V_F$ @ 2 ma

SILICON RECTIFIERS

Type	Case	V_R (max) v	I_o 50°C a	V_F (max) v @ a	I_R 25°C ma
1N253	II (DO-4)	100	3.0	1.5 @ 1.0	0.01
JAN 1N253	II (DO-4)	100	3.0	1.5 @ 1.0	0.01
1N254	II (DO-4)	200	3.0	1.5 @ 0.5	0.01
JAN 1N254	II (DO-4)	200	3.0	1.5 @ 0.5	0.01
1N255	II (DO-4)	400	3.0	1.5 @ 0.5	0.01
JAN 1N255	II (DO-4)	400	3.0	1.5 @ 0.5	0.01
1N256	II (DO-4)	600	3.0	2.0 @ 0.5	0.01
JAN 1N256	II (DO-4)	600	3.0	2.0 @ 0.5	0.01
1N332	II (DO-4)	400	1.2	2.0 @ 0.8	0.2*
1N333	II (DO-4)	400	0.6	2.0 @ 0.4	0.2*
1N334	II (DO-4)	300	1.2	2.0 @ 0.8	0.2*
1N335	II (DO-4)	300	0.6	2.0 @ 0.4	0.2*
1N336	II (DO-4)	200	1.2	2.0 @ 0.8	0.1*
1N337	II (DO-4)	200	0.6	2.0 @ 0.4	0.1*
1N338	II (DO-4)	100	3.0	2.0 @ 2.0	0.2*
1N339	II (DO-4)	100	1.2	2.0 @ 0.8	0.1*
1N340	II (DO-4)	100	0.6	2.0 @ 0.4	0.1*
1N341	II (DO-4)	400	1.2	2.0 @ 0.8	0.5*
1N342	II (DO-4)	400	0.6	2.0 @ 0.4	0.5*
1N343	II (DO-4)	300	1.2	2.0 @ 0.8	0.5*
1N344	II (DO-4)	300	0.6	2.0 @ 0.4	0.5*
1N345	II (DO-4)	200	1.2	2.0 @ 0.8	0.5*
1N346	II (DO-4)	200	0.6	2.0 @ 0.4	0.5*
1N347	II (DO-4)	100	3.0	2.0 @ 2.0	0.5*
1N348	II (DO-4)	100	1.2	2.0 @ 0.8	0.5*
1N349	II (DO-4)	100	0.6	2.0 @ 0.4	0.5*
1N440B	JJ (DO-1)	100	0.75	1.5 @ 0.75	0.3μa
1N441B	JJ (DO-1)	200	0.75	1.5 @ 0.75	0.75μa
1N442B	JJ (DO-1)	300	0.75	1.5 @ 0.75	1.0μa
1N443B	JJ (DO-1)	400	0.75	1.5 @ 0.75	1.5μa
1N444B	JJ (DO-1)	500	0.65	1.5 @ 0.65	1.75μa
1N445B	JJ (DO-1)	600	0.05	1.5 @ 0.65	2.0μa
1N530	JJ (DO-1)	100	0.3	2.0 @ 0.3	3.0μa
1N531	JJ (DO-1)	200	0.3	2.0 @ 0.3	7.5μa
1N532	JJ (DO-1)	300	0.3	2.0 @ 0.3	10.0μa
1N533	JJ (DO-1)	400	0.3	2.0 @ 0.3	15.0μa
1N534	JJ (DO-1)	500	0.3	2.0 @ 0.3	17.5μa
1N535	JJ (DO-1)	600	0.3	2.0 @ 0.3	20.0μa
1N536	JJ (DO-1)	50	0.75	1.0 @ 0.5	0.01
1N537	JJ (DO-1)	100	0.75	1.0 @ 0.5	0.01
1N538	JJ (DO-1)	200	0.75	1.0 @ 0.5	0.01
JAN 1N538	JJ (DO-1)	200	0.75	1.0 @ 0.5	0.01
1N539	JJ (DO-1)	300	0.75	1.0 @ 0.5	0.01
1N540	JJ (DO-1)	400	0.75	1.0 @ 0.5	0.01
JAN 1N540	JJ (DO-1)	400	0.75	1.0 @ 0.5	0.01
1N547	JJ (DO-1)	600	0.75	1.0 @ 0.5	0.01
JAN 1N547	JJ (DO-1)	600	0.75	1.0 @ 0.5	0.01
1N550	II (DO-4)	100	0.5	1.5 @ 0.5	0.5μa
1N551	II (DO-4)	200	0.5	1.5 @ 0.5	1.0μa
1N552	II (DO-4)	300	0.5	1.5 @ 0.5	1.5μa
1N553	II (DO-4)	400	0.5	1.5 @ 0.5	2.5μa
1N554	II (DO-4)	500	0.5	1.5 @ 0.5	3.5μa
1N555	II (DO-4)	600	0.5	1.5 @ 0.5	5.0μa
1N588	JJ (DO-1)	1500	0.015	10.0 @ 0.01	0.05
1N589	JJ (DO-1)	1500	0.05	8.0 @ 0.05	0.05
1N599	JJ (DO-1)	50	0.4	1.5 @ 0.2	0.025
1N599A	JJ (DO-1)	50	0.4	1.5 @ 0.4	1μa
1N600	JJ (DO-1)	100	0.4	1.5 @ 0.2	0.025
1N600A	JJ (DO-1)	100	0.4	1.5 @ 0.4	1μa
1N601	JJ (DO-1)	150	0.4	1.5 @ 0.2	0.025
1N601A	JJ (DO-1)	150	0.4	1.5 @ 0.4	1μa
1N602	JJ (DO-1)	200	0.4	1.5 @ 0.2	0.025
1N602A	JJ (DO-1)	200	0.4	1.5 @ 0.4	1μa
1N603	JJ (DO-1)	300	0.4	1.5 @ 0.2	0.025
1N603A	JJ (DO-1)	300	0.4	1.5 @ 0.4	1μa

Type	Case	V_R (max) v	I_o 50°C a	V_F (max) v @ a	I_R 25°C ma
1N604	JJ (DO-1)	400	0.4	1.5 @ 0.2	0.025
1N604A	JJ (DO-1)	400	0.4	1.5 @ 0.4	1.5μa
1N605	JJ (DO-1)	500	0.4	1.5 @ 0.2	0.025
1N605A	JJ (DO-1)	500	0.4	1.5 @ 0.4	2.0μa
1N606	JJ (DO-1)	600	0.4	1.5 @ 0.2	0.025
1N606A	JJ (DO-1)	600	0.4	1.5 @ 0.4	2.5μa
1N607	II (DO-4)	50	1.0	1.5 @ 0.2	0.025
1N607A	II (DO-4)	50	1.0	1.5 @ 0.2	1μa
1N608	II (DO-4)	100	1.0	1.5 @ 0.2	0.025
1N608A	II (DO-4)	100	1.0	1.5 @ 0.2	1μa
1N609	II (DO-4)	150	1.0	1.5 @ 0.2	0.025
1N609A	II (DO-4)	150	1.0	1.5 @ 0.2	1μa
1N610	II (DO-4)	200	1.0	1.5 @ 0.2	0.025
1N610A	II (DO-4)	200	1.0	1.5 @ 0.2	1μa
1N611	II (DO-4)	300	1.0	1.5 @ 0.2	0.025
1N611A	II (DO-4)	300	1.0	1.5 @ 0.2	1μa
1N612	II (DO-4)	400	1.0	1.5 @ 0.2	0.025
1N612A	II (DO-4)	400	1.0	1.5 @ 0.2	1.5μa
1N613	II (DO-4)	500	1.0	1.5 @ 0.2	0.025
1N613A	II (DO-4)	500	1.0	1.5 @ 0.2	2.0μa
1N614	II (DO-4)	600	1.0	1.5 @ 0.2	0.025
1N614A	II (DO-4)	600	1.0	1.5 @ 0.2	2.5μa
1N1095	JJ (DO-1)	500	0.75	1.0 @ 0.5	0.01
1N1096	JJ (DO-1)	600	0.75	1.0 @ 0.5	0.01
1N1100	JJ (DO-1)	100	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1101	JJ (DO-1)	200	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1102	JJ (DO-1)	300	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1103	JJ (DO-1)	400	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1104	JJ (DO-1)	500	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1105	JJ (DO-1)	600	0.75	1.5 @ 0.75	0.3 @ 150°C
1N1115	II (DO-4)	100	1.5	0.65 @ 1.5*	0.4*
1N1116	II (DO-4)	200	1.5	0.65 @ 1.5*	0.3*
1N1117	II (DO-4)	300	1.5	0.65 @ 1.5*	0.3*
1N1118	II (DO-4)	400	1.5	0.65 @ 1.5*	0.3*
1N1119	II (DO-4)	500	1.5	0.65 @ 1.5*	0.3*
1N1120	II (DO-4)	600	1.5	0.65 @ 1.5*	0.3*
1N1124	II (DO-4)	200	3.0	1.1 @ 1.0	0.01
1N1124	II (DO-4)	200	3.3	1.1 @ 1.0	0.01
USN 1N1124A	II (DO-4)	200	3.3	1.1 @ 1.0	0.00
1N1125	II (DO-4)	300	3.0	1.1 @ 1.0	0.01
1N1125A	II (DO-4)	300	3.3	1.1 @ 1.0	0.01
1N1126	II (DO-4)	400	3.0	1.1 @ 1.0	0.01
1N1126A	II (DO-4)	400	3.3	1.1 @ 1.0	0.01
USN 1N1126A	II (DO-4)	400	3.3	1.1 @ 1.0	0.01
1N1127	II (DO-4)	500	3.0	1.1 @ 1.0	0.01
1N1127A	II (DO-4)	500	3.3	1.1 @ 1.0	0.01
1N1128	II (DO-4)	600	3.0	1.1 @ 1.0	0.01
1N1128A	II (DO-4)	600	3.3	1.1 @ 1.0	0.01
USN 1N1128A	II (DO-4)	600	3.3	1.1 @ 1.0	0.01
1N1130	II (DO-4)	1500	0.3	1.0 @ 0.3•	0.05
USA 1N1130	II (DO-4)	1500	0.3	1.0 @ 0.3•	0.05
1N1131	II (DO-4)	1500	0.3	1.0 @ 0.3•	0.05
USA 1N1131	II (DO-4)	1500	0.3	1.0 @ 0.3•	0.05
1N1487	JJ (DO-1)	100	0.75	0.55 @ 0.25■	0.3*
1N1488	JJ (DO-1)	200	0.75	0.55 @ 0.25■	0.3*
1N1489	JJ (DO-1)	300	0.75	0.55 @ 0.25■	0.3*
1N1490	JJ (DO-1)	400	0.75	0.55 @ 0.25■	0.3*
1N1491	JJ (DO-1)	500	0.75	0.55 @ 0.25■	0.3*
1N1492	JJ (DO-1)	600	0.75	0.55 @ 0.25■	0.3*
1N1581	II (DO-4)	50	10.0	1.5 @ 6.0	0.3*
1N1582	II (DO-4)	100	10.0	1.5 @ 6.0	0.3*
1N1583	II (DO-4)	200	10.0	1.5 @ 6.0	0.3*
1N1584	II (DO-4)	300	10.0	1.5 @ 6.0	0.3*
1N1585	II (DO-4)	400	10.0	1.5 @ 6.0	0.3*
1N1586	II (DO-4)	500	10.0	1.5 @ 6.0	0.3*

SILICON RECTIFIERS

Type	Case	V_R (max) v	I_o 50°C a	V_F (max) v @ a	I_R 25°C ma
1N1587	II (DO-4)	600	10.0	1.5 @ 6.0	0.3*
1N1612	II (DO-4)	50	15.0	1.5 @ 10.0	0.3*
1N1613	II (DO-4)	100	15.0	1.5 @ 10.0	0.3*
1N1614	II (DO-4)	200	15.0	1.5 @ 10.0	0.3*
USA 1N1614	II (DO-4)	200	15.0	1.5 @ 10.0	0.3*
1N1615	II (DO-4)	400	15.0	1.5 @ 10.0	0.3*
USA 1N1615	II (DO-4)	400	15.0	1.5 @ 10.0	0.3*
1N1616	II (DO-4)	600	15.0	1.5 @ 10.0	0.3*
USA 1N1616	II (DO-4)	600	15.0	1.5 @ 10.0	0.3*
1N1692	JJ (DO-1)	100	0.75	0.55 @ 0.25■	0.3*
1N1693	JJ (DO-1)	200	0.75	0.55 @ 0.25■	0.3*
1N1694	JJ (DO-1)	300	0.75	0.55 @ 0.25■	0.3*
1N1695	JJ (DO-1)	400	0.75	0.55 @ 0.25■	0.3*
1N1696	JJ (DO-1)	500	0.75	0.55 @ 0.25■	0.3*
1N1697	JJ (DO-1)	600	0.75	0.55 @ 0.25■	0.3*
1N2069	GG	200	0.75	1.2 @ 0.5	10μa
1N2070	GG	400	0.75	1.2 @ 0.5	10μa
1N2071	GG	600	0.75	1.2 @ 0.5	10μa
1N2117	JJ	720	0.75 **25°C**	0.9 @ 0.75	1μa
1N2609	HH	50	0.75	1.0 @ 0.75	5μa
1N2610	HH	100	0.75	1.0 @ 0.75	5μa
1N2611	HH	200	0.75	1.0 @ 0.75	5μa
1N2612	HH	300	0.75	1.0 @ 0.75	5μa
1N2613	HH	400	0.75	1.0 @ 0.75	5μa
1N2614	HH	500	0.75	1.0 @ 0.75	5μa
1N2615	HH	600	0.75	1.0 @ 0.75	5μa
1N2616	HH	800	0.75	1.0 @ 0.75	5μa
1N2617	HH	1000	0.75 **100°C**	1.0 @ 0.75	5μa
1N3189	HH	200	1.0	1.0 @ 0.75	5μa
1N3190	HH	400	1.0	1.0 @ 0.75	5μa
1N3191	HH	600	1.0 **50°C**	1.0 @ 0.75	5μa
1N3775	II (DO-4)	1500	3.3 100°C	1.5 @ 2.0	5μa
1N3874	EEE (DO-10)	50	6	1.4 @ 6.0	15μa
1N3875	EEE (DO-10)	100	6	1.4 @ 6.0	15μa
1N3876	EEE (DO-10)	200	6	1.4 @ 6.0	15μa
1N3877	EEE (DO-10)	300	6	1.4 @ 6.0	15μa
1N3878	EEE (DO-10)	400	6	1.4 @ 6.0	15μa

Type	Case	V_R (max) v	I_o 100°C a	V_F (max) v @ a	I_R 25°C ma
1N3879	II (DO-4)	50	6	1.4 @ 6.0	15μa
1N3880	II (DO-4)	100	6	1.4 @ 6.0	15μa
1N3881	II (DO-4)	200	6	1.4 @ 6.0	15μa
1N3882	II (DO-4)	300	6	1.4 @ 6.0	15μa
1N3883	II (DO-4)	400	6	1.4 @ 6.0	15μa
1N3884	EEE (DO-10)	50	12	1.4 @ 12.0	5
1N3885	EEE (DO-10)	100	12	1.4 @ 12.0	5
1N3886	EEE (DO-10)	200	12	1.4 @ 12.0	5
1N3887	EEE (DO-10)	300	12	1.4 @ 12.0	5
1N3888	EEE (DO-10)	400	12	1.4 @ 12.0	5
1N3889	II (DO-4)	50	12	1.4 @ 12.0	5
1N3890	II (DO-4)	100	12	1.4 @ 12.0	5
1N3891	II (DO-4)	200	12	1.4 @ 12.0	5
1N3892	II (DO-4)	300	12	1.4 @ 12.0	5
1N3893	II (DO-4)	400	12	1.4 @ 12.0	5
1N3909	KK	50	30	1.4 @ 30	80μa
1N3910	KK	100	30	1.4 @ 30	80μa
1N3911	KK	200	30	1.4 @ 30	80μa
1N3912	KK	300	30	1.4 @ 30	80μa
1N3913	KK	400	30 50°C	1.4 @ 30	80μa
1N4001	LL	50	1	1.1 @ 1	10μa
1N4002	LL	100	1	1.1 @ 1	10μa
1N4003	LL	200	1	1.1 @ 1	10μa
1N4004	LL	400	1	1.1 @ 1	10μa
1N4005	LL	600	1	1.1 @ 1	10μa
1N4006	LL	800	1	1.1 @ 1	10μa
1N4007	LL	1000	1 50°C	1.1 @ 1	10μa
1N4364	JJ (DO-1)	100	0.75	1.1 @ 0.75	1.0μa
1N4365	JJ (DO-1)	200	0.75	1.1 @ 0.75	1.0μa
1N4366	JJ (DO-1)	300	0.75	1.1 @ 0.75	1.0μa
1N4367	JJ (DO-1)	400	0.75	1.1 @ 0.75	1.0μa
1N4368	JJ (DO-1)	500	0.75	1.1 @ 0.75	1.0μa
1N4369	JJ (DO-1)	600	0.75 75°C	1.1 @ 0.75	1.0μa
1N4374	JJ (DO-1)	1500	0.75 100°C	1.5 @ 0.5	300μa*
1N4383	FFF	200	1.0	1.3 @ 1.0	275μa*
1N4384	FFF	400	1.0	1.3 @ 1.0	250μa*
1N4385	FFF	600	1.0	1.3 @ 1.0	225μa*
1N4537	GGG	1500	3.0	1.85 @ 3.0	0.3*
1N4538	GGG	2000	3.0	1.85 @ 3.0	0.3*
1N4539	GGG	2500	3.0	1.85 @ 3.0	0.3*
1N4540	GGG	3000	3.0	0.85 @ 3.0	0.3*

* Full cycle avg. @ 150°C

§ For each half-wave section

■ Full cycle avg. @ 125°C

• TI typical V_F = 1.0 volt

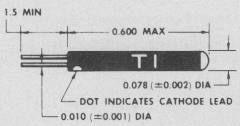
NOTE: Add "R" suffix to type number for reverse polarity.

SILICON PLANAR AND PLANAR EPITAXIAL SENSORS

LS 400

	Parameter	Test Conditions	
I_L	Light Current	V_{CE} =5 vdc H =9 mw/cm²*	1.0 ma min
I_D	Dark Current	V_{CE} =30 vdc	0.025 μa max
$I_{L/H}$	Sensitivity	H =300 to 600 Ft. Candles V_{CE} =5 vdc	7 μa/Ft. Candle Typical
P	Power Dissipation		50 mw max

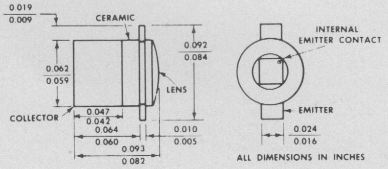
* Irradiation (H) equals 9 mw/cm² between 0.7 and 1.0 microns



LSX 600

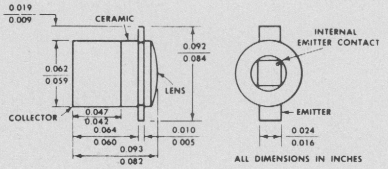
	Parameter	Test Conditions	
I_L	Light Current	V_{CE} =5v, H =20 mw/cm²*	0.8 ma min
I_d	Dark Current	V_{CE} =30v, H =0	0.025 μa max
I_d	Dark Current	V_{CE} =30v, H =0 T_A =100°C	10.0 μa typ
V_{CE} (sat)	Collector-Emitter Saturation Voltage	I_L =0.4ma, H =20 mw/cm²*	0.3 volt typ

* Derate linearly to 125°C free-air temperature at the rate of .5 mw/C°. Irradiance (H) is the radiant power per unit area incident upon a surface. For this measurement the source is on at a 2870°K color temperature.



LSX 900

	Parameter	Test Conditions	
$V_{(BR)}$	Breakdown Voltage	I_R =100 μa	125 v min, 140 v typ
I_L	Light Current	V_R =30 v, H =20 mw/cm²,	6 μa min, 7.8 μa typ
I_D	Dark Current	V_R =50 v, H =0,	0.3 na typ, 9 na max
C_j	Junction Capacitance	V_R =10 v, f =1 Mc	2.9 pf typ
C_j	Junction Capacitance	$V_R \geq V_{pt} \approx 60$ v, f =1 Mc	1.7 pf typ

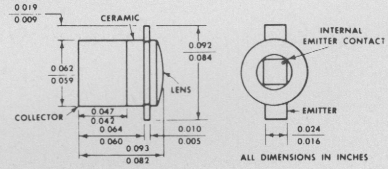


SILICON PLANAR LIGHT-ACTIVATED SWITCH

LS 515

	Parameter	Test Conditions	
I_{FD}	Forward Dark Current	V_F =10 v, H =0,*	1 μa max
H_T	Light Intensity to Trigger	V_{FM} =60 v (half-sine-wave), R_L =5 kΩ, f =60 cps,	5 mw/cm² min 17.5 mw/cm² max
V_F	Static Forward Voltage	I_F =100 ma,	1.5 v max

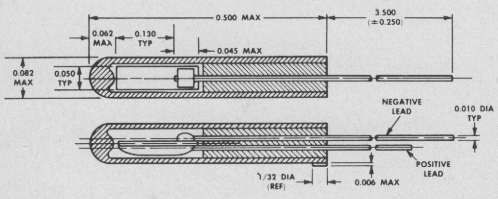
* Stray irradiation outside the range of device sensitivity may be present. A satisfactory condition has been achieved when the parameter being measured approaches a value which cannot be altered by further irradiation shielding.



SILICON PHOTOVOLTAIC LIGHT SENSOR

LS 222

Test Conditions	Output (typ)	Load (ohms)
1250 ft. candles 2800° K	290 μamps	1,000



SILICON PHOTO DEVICES

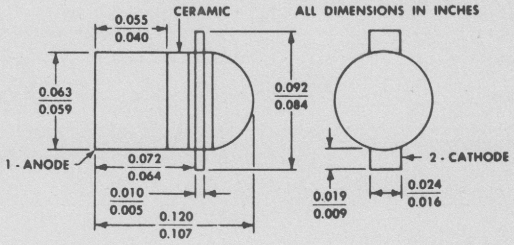
Type	Case	Dark Current ±50 v Max μa (na)	Light Current* ±10 v Min μa
H-11	CC	0.5	40
H-35	CC	0.5	60
H-38	CC	10.0	100
H-60	CC	0.5	100
H-61	CC	0.5	200
H-62	CC	0.5	300
LS-400	CC	0.25 at 30 v	1000§
LSX-600	LS600	0.025 at 30 v	800†§
LSX-515 (1N4378)	LS600	1 at 10 v	
LSX-900	LS600	(9 na)	6 at 30 v†
1N2175	CC	0.5	100

* Measured in terms of radiation =9 mw/cm² in a frequency bandwidth of 0.7 to 1.0 micron.
† H =20 mw/cm², unfiltered linear tungsten filament at 2870°K.
‡ Light intensity to trigger, H_T =5 to 17.5 mw/cm².
§ At 5 volts.

GALLIUM ARSENIDE INFRARED SOURCES

TIXLO1

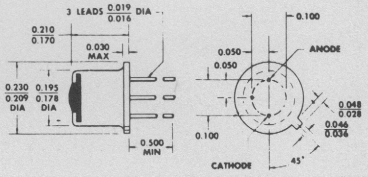
	Parameter	Test Conditions	
λ	Wavelength at Peak Emission	I_F = 50 ma	0.9 μ, typ
P_O	Radiant Power Output Into 90° Circular Cone	I_F = 50 ma	50 μw, min
P_O	Radiant Power Output Into 10° Circular Cone	I_F = 50 ma	3 μw, min
V_F	Static Forward Voltage	I_F = 50 ma	1.3 v, max
C_T	Total Capacitance	V = 0, f = 1 Mc	75 pf, max



TIXLO2

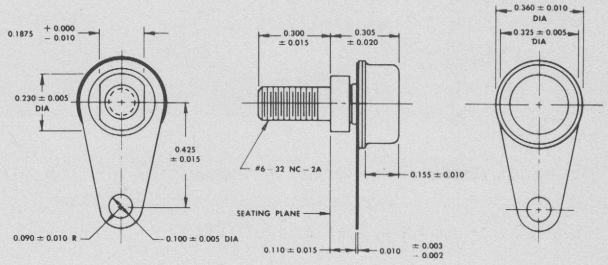
	Parameter	Test Conditions	Typ	Units
λ	Wavelength at Peak Emission	I_F = 100 ma	0.9	micron
P_O	Radiant Power Output Into 90° Circular Cone	I_F = 100 ma	90 μw,	min
V_F	Forward Voltage	I_F = 100 ma	1.2	v
C_T	Total Capacitance†	V = 0, f = 1 mc	1000	pf
N_O	Light Output	I_F = 100 ma	2×10^{14}	photons/sec

† Header capacitance is typically 1.5 pf measured at 1 Mc. Total capacitance is junction capacitance plus header capacitance.



TIXLO3

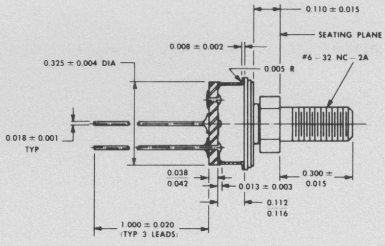
	Parameter	Test Conditions	Typ	Units
λ	Wavelength at Peak Emission	I_F = 2a	0.92	micron
P	Light Power	I_F = 2a	20	mw
V_F	Forward Voltage	I_F = 2a	1.6	v
C_T	Total Capacitance	V = 0, f = 1 mc	150	pf
N	Light Quanta	I_F = 2a	9×10^{16}	photons/sec



OPTOELECTRONIC CHOPPERS AND SWITCHES

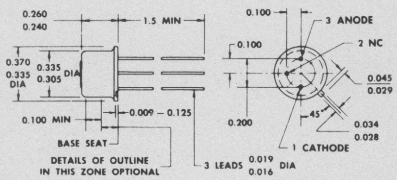
PEX3003

Parameter	Test Conditions	
Noise (Switching Transient)	I_D = 100 ma square wave, 400 cps	3 μv typ (rms)
Switch "On" Impedance	I_D = 100 ma, I_S = ±1 ma	30 ohms typ
Switch "Off" Current	V_S = ±3 v	5 na max
Switch "Off" Current	V_S = ±3 v, T_C = 75°C	100 na max
Rise Time	I_D = 100 ma square wave V_S = ±1.5 v	10 μsec typ
Switch Offset Voltage	I_D = 100 ma T_C = 25°C to 75°C	100 μv max
Drive Forward Voltage Drop	I_D = 100 ma	1.3 v typ



NP SILICON PLANAR EPITAXIAL COMMUNICATION DETECTOR

	Parameter	Test Conditions	TIXL51		TIXL52		TIXL53		Unit
			Min	Typ	Min	Typ	Min	Typ	
$V_{(BR)}$	Breakdown Voltage	I_R = 100 μa	75		80		100		v
I_L	Light Current	V_R = 5 v, H = 20 mw/cm²		90		25		10	μa
C_T	Capacitance	V_R = 30 v, f = 1 mc		110		40		24	pf
D*	Detectivity	(2800, 1000, 1)		2.2×10^{11}		1.3×10^{11}		8.0×10^{11}	cm-sec/watt⁻¹



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE.

ALL JEDEC TO-5 DIMENSIONS AND NOTES ARE APPLICABLE.

SILICON GROWN UNIJUNCTION TRANSISTORS

Type	Case	Mfg Process	Rated V_{BB} v	Intrinsic Standoff Ratio	Static Interbase Resistance kilohms	Rated Static Interbase Voltage v	Peak Emitter Current a	Emitter Reverse Current μa
2N489	U	G	65	.51-.62	4.7-6.8	65	2	12
USAF2N489	U	G	65	.51-.62	3.7-6.8	65	2	12
2N489A	U	G	65	.51-.62	4.7-6.8	65	2	20
2N489B	U	G	65	.51-.62	4.7-6.8	65	2	0.2
2N490	U	G	65	.51-.62	6.2-9.1	65	2	12
USAF2N490	U	G	65	.51-.62	6.2-9.1	65	2	12
2N490A	U	G	65	.51-.62	6.2-9.1	65	2	20
2N490B	U	G	65	.51-.62	6.2-9.1	65	2	0.2
2N491	U	G	65	.56-.68	4.7-6.8	65	2	12
USAF2N491	U	G	65	.56-.68	4.7-6.8	65	2	12
2N491A	U	G	65	.56-.68	4.7-6.8	65	2	20
2N491B	U	G	65	.56-.68	4.7-6.8	65	2	0.2
2N492	U	G	65	.56-.68	6.2-9.1	65	2	12
USAF2N492	U	G	65	.56-.68	6.2-9.1	65	2	12
2N492A	U	G	65	.56-.68	6.2-9.1	65	2	20
2N492B	U	G	65	.56-.68	6.2-9.1	65	2	0.2
2N493	U	G	65	.62-.75	4.7-6.8	65	2	12
USAF2N493	U	G	65	.62-.75	4.7-6.8	65	2	12
2N493A	U	G	65	.62-.75	4.7-6.8	65	2	20
2N493B	U	G	65	.62-.75	4.7-6.8	65	2	0.2
2N494	U	G	65	.62-.75	6.2-9.1	65	2	12
USAF2N494	U	G	65	.62-.75	6.2-9.1	65	2	12
2N494A	U	G	65	.62-.75	6.2-9.1	65	2	12
2N494B	U	G	65	.62-.75	6.2-9.1	65	2	0.2
2N494C	U	G	65	.62-.75	6.2-9.1	65	2	2
2N1671	U	G	35	.47-.62	4.7-9.1	35	2	12
2N1671A	U	G	35	.47-.62	4.7-9.1	35	2	12
2N1671B	U	G	35	.47-.62	4.7-9.1	35	2	0.2
2N2160	U	G	35	.47-.80	4.0-12	35	2	12

SILICON DARLINGTON TRANSISTOR (NPN)

Type	Case	Mfg Process	h_{FE}	Rated V_{CBO} v	$-55°C$ h_{FE}	$V_{CE\ (sat)}$ Max v	Pwr Diss Case 25°C w
2N997	R (TO-18)	EP	7000-70,000	75	1000 min	1.6	1.5

SILICON DUAL TRANSISTORS

Type	Case	Mfg Process	Polarity	Nearest Equivalent Triode	h_{FE} Match %	V_{BE} Match mv max	$\Delta(V_{BE1}\text{-}V_{BE2})/\Delta T_A$ μv/C° max	h_{FE} @ 10 μa
2N2060	V	P	NPN	2N1711	10	5	10	25-75
2N2060A	V	P	NPN	2N1711	10	10	5	25-75
2N2223	TTT	P	NPN	2N1711	20	15	25	15 min
2N2223A	TTT	P	NPN	2N1711	10	5	25	15 min
2N2453	TTT	P	NPN	2N930	10	3	10	80 min
2N2639	TTT	P	NPN	2N929	10	5	10	50-300
2N2640	TTT	P	NPN	2N929	20	10	20	50-300
2N2641	TTT	P	NPN	2N929				50-300
2N2642	TTT	P	NPN	2N930	10	5	10	100-300
2N2643	TTT	P	NPN	2N930	20	10	20	100-300
2N2644	TTT	P	NPN	2N930				100-300
2N2802	TTT	EP	PNP	2N2411	10	5	10	15 min
2N2803	TTT	EP	PNP	2N2411	20	10	20	15 min
2N2804	TTT	EP	PNP	2N2411				15 min
2N2805	TTT	EP	PNP	2N2412	10	5	10	30 min
2N2806	TTT	EP	PNP	2N2412	20	10	20	30 min
2N2807	TTT	EP	PNP	2N2412				30 min
2N3347	TTT	EP	PNP	2N2604	10	5	10	40-300
2N3348	TTT	EP	PNP	2N2604	20	10	20	40-300
2N3349	TTT	EP	PNP	2N2604	40	20	40	40-300
2N3350	TTT	EP	PNP	2N2605	10	5	10	100-300
2N3351	TTT	EP	PNP	2N2605	20	10	20	100-300
2N3352	TTT	EP	PNP	2N2605	40	20	40	100-300
2N3680	TTT	P	NPN	2N2484	10	3	5	150-600
2N3838	KKK	EP	NPN/PNP	2N2222/2N2907				

SILICON FIELD-EFFECT TRANSISTORS

Type	Case	Mfg. Process	Polarity	I_{DSS} ma	Y_{fs} Transconductance μmho	Min $V_{(BR)GSS}$ v	Max C_{iss} pf	Max V_{GS} v	Max NF 1 Kc db	Max I_{GSS} na
TISX11	VVV	MOS	P-chan	0.010 Max.	800 Min.	30	8			0.003
TIS14	VVV	P	N-chan	0.5—15.0	1000-7500	30	8	6.5		1.0
2N2386	I-2 (TO-5)	P	(P-chan)		1000 min	20	50			10
2N2497	I-2 (TO-5)	P	(P-chan)	1–3	1000-2000	20	32	5	3	10
2N2498	VVV (TO-72)	P	(P-chan)	2–6	1500-3000	20	32	6	3	10
2N2499	VVV (TO-72)	P	(P-chan)	5–15	2000-4000	20	32	8	4	10
2N2500	VVV (TO-72)	P	(P-chan)	1–6	1000-2200	20	32	6	1	10
2N3328	VVV (TO-72)	P	(P-chan)	1 max	100 min	20	4	6	3	1.0
2N3329	VVV (TO-72)	P	(P-chan)	1–3	1000-2000	20	20	5	3	16
2N3330	VVV (TO-72)	P	(P-chan)	2–6	1500-3000	20	20	6	3	10
2N3331	VVV (TO-72)	P	(P-chan)	5–15	2000-4000	20	20	8	4	10
2N3332	VVV (TO-72)	P	(P-chan)	1–6	1000-2200	20	20	6	1	10
2N3573	VVV (TO-72)	P	(P-chan)	.02 – .1	100- 300	25	6	2	3	0.6
2N3574	VVV (TO-72)	P	(P-chan)	.075– .375	200- 600	25	6	2	3	0.6
2N3575	VVV (TO-72)	P	(P-chan)	.2 – 1.0	300- 900	25	6	4	3	0 6
2N3821	VVV (TO-72)	EP	(N-chan)	0.5 — 2.5	1500-4500	50	6	4		.1
2N3822	VVV (TO-72)	EP	(N-chan)	2 —10	3000-6500	50	6	6		.1
2N3823	VVV (TO-72)	EP	(N-chan)	4 —20	3500-6500	30	6	8		.5
2N3909	VVV (TO-72)	P	(P-chan)	.3 —15	1000-5000	20	32	7.9		10

SILICON DUAL FIELD-EFFECT TRANSISTORS

Type	Case	Mfg. Process	Polarity	Y_{fs} Transconductance μmho	Y_{fs} I_{DSS}, V_{GS} Match %	Gate-source-voltage Differential max, mv	Max C_{iss} pf	Min BV_{GSS} v	Max I_{GSS} na
TIS25	TTT	EP	(N-chan)	1500-6000		5	8	50	0.25
TIS26	TTT	EP	(N-chan)	1500-6000		10	8	50	0.25
TIS27	TTT	EP	(N-chan)	1500-6000		15	8	50	0.25
2N3333	KKK (TO-89)	P	(P-chan)	600–1800	5	15	30	20	10
2N3334	KKK (TO-89)	P	(P-chan)	600–1800	5	20	30	20	10
2N3335	KKK (TO-89)	P	(P-chan)	600–1800	10	40	30	20	10
2N3336	KKK (TO-89)	P	(P-chan)	600–1800	20	50	30	20	10

SILICON FIELD-EFFECT CHOPPERS

Type	Case	Mfg Process	Polarity	C_{iss} Input Capacitance max, pf	$Y_{DS(ON)}$ Drain-Source Resistance max, ohms	Min $V_{(BR)GSS}$ v	Max $I_{D(off)}$ na	Y_{fs} μmho	Max I_{GSS} na
TIS05	VVV (TO-72)	P	P-chan	12	150	25	2.0	6 K - 12 K	2.0
2N3824	VVV (TO-72)	EP	(N-chan)	(Chopper)	(Chopper)	50	6	(Chopper)	.1

SILICON CHOPPERS

Type	Case	Mfg Process	Polarity	$V_{EC(off)}$ Offset Voltage μv	$r_{ec(on)}$ On Resistance ohms	Min $V_{(BR)ECO}$ v	Max I_{EBO} na	Min $h_{fe(inv)}$ @ I_E = 0.2 ma	Max C_{obo} pf
2N2432	R	P	NPN	500	20	15	2.0	2	12
2N2944	MMM (TO-46)	EP	PNP	300	20	10	0.1	6	10
2N2945	MMM (TO-46)	EP	PNP	500	15	20	0.2	4	10
2N2946	MMM (TO-46)	EP	PNP	800	45	35	0.5	3	10

SILICON DOUBLE-EMITTER CHOPPERS

Type	Case	Mfg Process	Polarity	Offset Voltage μv	On Resistance ohms	Rated Emitter 1 to Emitter 2 Voltage v	Max 100°C I_{E1E2} na	Max $\Delta V_{E1E2}/\Delta T_A$ μv	Max C_{e1B} C_{e2B} pf
3N74	VVV (TO-72)	P	NPN	50	10-40	± 18	± 100	75	5
3N75	VVV (TO-72)	P	NPN	100	10-40	± 18	± 100	125	5
3N76	VVV (TO-72)	P	NPN	200	10-50	± 18	± 100	175	5
3N77	VVV (TO-72)	P	NPN	50	10-50	± 12	± 100	75	5
3N78	VVV (TO-72)	P	NPN	100	10-50	± 12	± 100	125	5
3N79	VVV (TO-72)	P	NPN	200	10-60	± 12	± 200	175	6
3N108	VVV (TO-72)	EP	PNP	50	10-50	± 50	± 10	50	3
3N109	VVV (TO-72)	EP	PNP	150	10-50	± 50	± 10	150	3
3N110	VVV (TO-72)	EP	PNP	50	10-50	± 30	± 50	50	3
3N111	VVV (TO-72)	EP	PNP	150	10-50	± 30	± 50	150	3

SILICON AVALANCHE SWITCHES, (NPN)

Type	Case	Mfg Process	Polarity	Collector Hold-Off Current μa	Output Pulse Amplitude	$V_{(BR)CER}$ v	Max I_{CES} μa	Max C_{ib} pf
2N3033/TI610	R (TO-18)	EM	NPN	2	45	100	5	12
2N3034/TI611	R (TO-18)	EM	NPN	2	30	70	5	12
2N3035/TI612	R (TO-18)	EM	NPN	2	20	50	5	12

SILICON MINIATURE TRANSISTORS

Type	Case	Mfg Process	Polarity	Nearest Equivalent (Dual/Single)	Function	Power Dissipation 25°C Ambient mw
TO-50 PACKAGE (FORMERLY "μMESA ™")						
2N849	O (TO-50)	EP	NPN	2N706A	Switch	300
2N850	O (TO-50)	EP	NPN	2N753	Switch	300
2N851	O (TO-50)	EP	NPN	2N743	Switch	300
2N852	O (TO-50)	EP	NPN	2N744	Switch	300
2N2387/TI420	O (TO-50)	P	NPN	2N929	Amp	450
2N2388/TI421	O (TO-50)	P	NPN	2N930	Amp	450
2N2389/TI424	O (TO-50)	E	NPN	2N1613	GP	450
2N2390/TI425	O (TO-50)	E	NPN	2N1711	GP	450
2N2393/TI428	O (TO-50)	E	PNP	2N1131	GP	450
2N2394/TI429	O (TO-50)	E	PNP	2N1132	GP	450
2N2395/TI432	O (TO-50)	E	NPN	2N696	GP	450
2N2396/TI433	O (TO-50)	E	NPN	2N697	GP	450
2N3037	O (TO-50)	EP	NPN	2N2243	GP	360
2N3038	O (TO-50)	EP	NPN	2N1890	GP	360
2N3039	O (TO-50)	EP	PNP	2N2904	GP	360
2N3040	O (TO-50)	EP	PNP	2N2904	GP	360
DUAL FLAT-PACK						
2N3043	KKK (TO-89)	P	NPN	2N2642/2N930	Diff Amp	250 per triode
2N3044	KKK (TO-89)	P	NPN	2N2643/2N930	Diff Amp	250 per triode
2N3045	KKK (TO-89)	P	NPN	2N2644/2N930	Dual	250 per triode
2N3046	KKK (TO-89)	P	NPN	2N2639/2N929	Diff Amp	250 per triode
2N3047	KKK (TO-89)	P	NPN	2N2640/2N929	Diff Amp	250 per triode
2N3048	KKK (TO-89)	P	NPN	2N2641/2N929	Dual	250 per triode
2N3049	KKK (TO-89)	E	PNP	2N2805/2N2412	Diff Amp	250 per triode
2N3050	KKK (TO-89)	EP	PNP	2N2806/2N2412	Diff Amp	250 per triode
2N3051	KKK (TO-89)	EP	PNP	2N2807/2N2412	Dual	250 per triode
2N3052	KKK (TO-89)	EP	NPN	2N914	Dual	250 per triode
2N3333	KKK (TO-89)	P	(P-chan)	2N2497(FET)	Diff Amp	20 per triode
2N3334	KKK (TO-89)	P	(P-chan)	2N2497(FET)	Diff Amp	20 per triode
2N3335	KKK (TO-89)	P	(P-chan)	2N2497(FET)	Diff Amp	20 per triode
2N3336	KKK (TO-89)	P	(P-chan)	2N2497(FET)	Diff Amp	20 per triode
CHIP-PAK						
TIS22	WWW	P	NPN	2N929	Amplifier	150
TIS23	WWW	P	NPN	2N930	Amplifier	150
TIS24	WWW	P	NPN	2N2484	Amplifier	150

TRANSISTORS FOR CONSUMER CIRCUIT APPLICATIONS

SILICON:

Type	Case	Mfg Process	Polarity	Nearest Equivalent	Power Diss T_A = 25°C mw	Rated V_{CEO} v	Function
TIS18	LLL	P	NPN	2N918	200	13	UHF Amplifier
TI407	LLL	P	NPN	2N918	200	12	HF Amplifier
TI408	LLL	P	NPN	2N918	200	12	HF Amplifier
TI409	LLL	P	NPN	2N918	200	12	HF Amplifier
TI411	LLL	EP	NPN	2N2217	300	30	NPN Audio
TI419	LLL	P	NPN	2N929	250	30	LL Amplifier
TIXS28	LLL	P	NPN		200	40	VHF-RF Amplifier
TIXS29	LLL	P	NPN		200	40	VHF Mixer
TIXS30	LLL	P	NPN		200	40	VHF Osc.
TIXS31	LLL					40	Video IF Amplifier
2N3702	LLL	P	NPN	2N2904	300	25	PNP Audio
2N3703	LLL	P	NPN	2N2904	300	30	PNP Audio
2N3704	LLL	EP	NPN	2N2217	300	30	NPN Audio
2N3705	LLL	EP	NPN	2N2217	300	30	NPN Audio
2N3706	LLL	EP	NPN	2N2217	300	20	NPN Audio
2N3707	LLL	P	NPN	2N929	250	30	LL Amplifier
2N3708	LLL	P	NPN	2N929	250	30	LL Amplifier
2N3709	LLL	P	NPN	2N929	250	30	LL Amplifier
2N3710	LLL	P	NPN	2N929	250	30	LL Amplifier
2N3711	LLL	P	NPN	2N929	250	30	LL Amplifier
2N3712	I	EP	NPN	2N3114	800		Video Amplifier
2N3825	LLL	EP	NPN		250	15	RF Amplifier
2N3826	LLL	P	NPN	2N915	200	45	RF IF Amp. & Osc.
2N3827	LLL	P	NPN	2N915	200	45	RF IF Amp. & Osc.
2N3828	LLL	EP	NPN		300	40	TV Video IF

GERMANIUM:

Type	Case	Mfg Process	Power Diss T_A = 25°C mw	Max C_{cb} pf	Max $r_b'C_c$ psec	Min f_T Mc
TIXM01	NNN	EP	75	1	15	355
TIXM02	NNN	EP	75	1	15	282
TIXM03	NNN	EP	75	1	15	316
TISM04	NNN	EP	75	1	15	224
TIXM05	NNN	EP	75	1	7.5	450
TIXM06	NNN	EP	75	1	10	380
TIXM07	NNN	EP	75	1	15	315
TIXM08	NNN	EP	75	1	15	380

Type	Case	Mfg Process	Pwr Diss Free Air mw	Collector Current ma	Collector Voltage v	Max C_{re} pf	Max $r_b'C_c$ psec	f_T Mc Typ
TI390	R (TO-18)	EM	75	50	18	1	15	500
TI391	R (TO-18)	EM	75	50	18	1	15	500
TI400	R-4**	EM	75	50	18	1	15	500
TI401	R-4**	EM	75	50	18	1	15	500
TI402	R-4**	EM	75	50	18	1	15	500
TI403	R-4**	EM	75	50	18	1	15	500
						C_{ob}		
TIXM201	R-3*	EM	75	50	30	2.5	40	300
TIXM202	R-3*	EM	75	50	30	2.5	50	300
TIXM203	R-3*	EM	75	50	30	2.5	50	300
TIXM204	R-3*	EM	75	50	30	2.5	50	300
TIXM205	R-3*	EM	75	50	30	2.5	75	300
TIXM206	R-3*	EM	75	50	30	2.5	75	300

**R-4 is similar to TO-18 case with four leads in line.
*R-3 is similar to TO-18 case with three leads in line.

MEET OR EXCEED MIL-R-10509 SPECIFICATIONS

HARD GLASS HERMETIC PRECISION CARBON-FILM RESISTORS

TI type number	wattage rating-watts TI	MIL B	MIL D	MIL G	MIL design-nation	standard resistance ranges	max. recom-mended voltage volts	body length*	body diameter (B)
—					—	—	—	inches	inches
CG⅛	⅛	—	⅛	1/10	RN55	10Ω to 100K	250	0.240 (+.010 −.020)	0.125 (±0.015)
CG¼	¼	⅛	¼	⅛	RN60	10Ω to 1.0 MegΩ	350	0.360 (+.025 −.015)	0.140 (±0.020)
CG½	½	¼	½	¼	RN65	10Ω to 2.0 MegΩ	500	0.560 (±.025)	0.225 (±0.020)

* Length of glass package Fillets on leads extend 0.035 inch maximum beyond glass

EPOXY-PLUS PRECISION CARBON-FILM RESISTORS*

TI type number	wattage rating-watts TI	MIL B	MIL D	MIL Design-nation	standard resistance ranges	max. recom-mended voltage volts	body length inches	body diameter inches
CR⅛	⅛	—	⅛	RN55D	10 ohm-301K	300	.250 (±0.031)	.095 (±0.015)
CR¼	¼	⅛	¼	RN60D, B	10 ohm-1 Meg	400	.375 (+0.062 −0.031)	.105 (+0.015 −0.010)
CR½	½	¼	½	RN65D, B	10 ohm-2 Meg	750	.600 (±0.031)	.171 (±0.015)
CR1	1	½	¾	RN65D, B	10 ohm-2.49 Meg	850	.760 (±0.031)	.220 (±0.015)

Nominal lead length 1.5 inches. Resistance values available in ±1%, ±2%, ±5% tolerances.

MOLDED LINE PRECISION CARBON-FILM RESISTORS

TI type number	wattage rating watts	MIL design-nation	standard resistance ranges	max. recom-mended voltage volts	body length inches	body diameter inches
CDM⅛	⅛	RN60B	10 Ohm-1 Meg	350	0.400 (±0.010)	0.135 (±0.010)
CDM¼	¼	RN65B	10 Ohm-1 Meg	500	0.585 (±0.010)	0.200 (±0.010)
CDM½	½	RN70B	10 Ohm-5 Meg	750	0.750 (±0.015)	0.250 (±0.020)
CDM 1	1	RN75B	10 Ohm-10 Meg	1000	1.062 (±0.020)	0.375 (±0.025)
CDM 2	2	RN80B	10 Ohm-50 Meg	2000	2.187 (±0.020)	0.375 (±0.025)

Nominal lead length 1.5 inches; Resistance values available in ±1%, ±2%, ±5% tolerances

EPOXY LINE (FORMERLY MIL-LINE) PRECISION CARBON-FILM RESISTORS

TI type number	wattage rating watts	MIL design-nation	standard resistance ranges	max. recom-mended voltage volts	body length inches	body diameter inches
CD⅛ GR	⅛	—	10 Ohms-100K	300	0.260 (+ .005 − .010)	0.095 (+ .005 − .010)
CD⅛ R	⅛	—	10 Ohm-1 Meg	350	0.325 (±0.050)	0.095 (±0.015)
CD¼ R	¼	RN10X	10 Ohm-1 Meg	500	0.480 (±0.050)	0.095 (±0.020)
CD½ PR	½	RN15X	10 Ohm-3 Meg	650	0.455 (±0.050)	0.160 (±0.025)
CD½ MR	½	RN20X	10 Ohm-5 Meg	750	0.530 (±0.050)	0.160 (±0.025)
CD½ SR	½	—	50 Ohm-10 Meg	850	0.800 (±0.050)	0.160 (±0.025)
CD1R	1	RN25X	10 Ohm-10 Meg	1000	0.915 (±0.050)	0.300 (±0.025)
CD2R	2	RN30X	10 Ohm-50 Meg	2000	2.050 (±0.050)	0.300 (±0.025)

Nominal lead length 1.5 inches; Resistance values available in ±1%, ±2%, ±5% tolerances

GENERAL-PURPOSE CARBON-FILM RESISTORS (± 5% TOLERANCE)

TI type number	wattage rating watts	MIL design-nation	standard resistance ranges	max. working voltage volts	body length inches	body diameter inches
GP¼	¼	RC07	10Ω-300 k	250	0.250 (±0.031)	0.090 (±0.008)
GP½	½	RC20	10Ω-1 Meg	350	0.375 (±0.031)	0.140 (±0.008)
GP1	1	RC32	10Ω-1 Meg	500	0.530 (+0.040 −0.030)	0.150 (±0.015)
GP2	2	RC42	10Ω-2 Meg	500	0.688 (±0.031)	0.312 (±0.008)

EPOXY PRECISION METAL FILM RESISTORS

TI type number	wattage rating watts	MIL design-nation	standard resistance ranges	max. working voltage volts	body length inches	body diameter inches
MC55	⅛	RN55	49.9Ω-100 k	250	0.250 (±0.031)	0.095 (±0.015)
MC60	¼	RN60	49.9Ω-499 k	300	0.375 (±0.031)	0.140 (±0.010)
MC65	½	RN65	49.9Ω-1 Meg	350	0.575 (±0.031)	0.171 (±0.015)

METAL FILM MOLDED PRECISION RESISTORS

TI type number	wattage rating watts	MIL design-nation	standard resistance ranges	max. recom-mended voltage volts	body length inches	body diameter inches
MM60	⅛	RN60	49.9Ω-499K	250	0.400 (±0.010)	0.135 (±0.010)
MM65	¼	RN65	49.9Ω-1 Meg	300	0.575 (±0.010)	0.200 (±0.010)
MM70	½	RN70	24.9Ω-1 Meg	350	0.750 (±0.010)	0.250 (±0.010)

Nominal lead length 1.5 inches, Resistance values available in ±0.1%, ±0.25%, ±0.5%, ±1% tolerances.
Temperature Coefficient to ±10ppm/°C, T-2±50ppm/°C, T-9±25ppm/°C.

E.I.A. DECADE TABLE TOLERANCES G (±2%), J (±5%)

10	11	12	13	15	16	18	20
22	24	27	30	33	36	39	43
47	51	56	62	68	75	82	91

DECADE TABLE FOR DETERMINING MIL-BELL STANDARD RESISTANCE VALUES

Standard Resistance Values are obtained from the Decade Table by multiplying by multiples of 10. As an example, 1.33 can represent 13.3 ohms, 133 ohms, 1.33 K, 13.3 K, 133 K, 1.33 megohms.

0.1, 0.25, ½, 1, 2, and 5% TOLERANCES

1.00	1.21	1.47	1.78	2.15	2.61	3.16	3.83	4.64	5.62	6.81	8.25
1.02	1.24	1.50	1.82	2.21	2.67	3.24	3.92	4.75	5.76	6.98	8.45
1.05	1.27	1.54	1.87	2.26	2.74	3.32	4.02	4.87	5.90	7.15	8.66
1.07	1.30	1.58	1.91	2.32	2.80	3.40	4.12	4.99	6.04	7.32	8.87
1.10	1.33	1.62	1.96	2.37	2.87	3.48	4.22	5.11	6.19	7.50	9.09
1.13	1.37	1.65	2.00	2.43	2.94	3.57	4.32	5.23	6.34	7.68	9.31
1.15	1.40	1.69	2.05	2.49	3.01	3.65	4.42	5.36	6.49	7.87	9.53
1.18	1.43	1.74	2.10	2.55	3.09	3.74	4.53	5.49	6.65	8.06	9.76

sensistor® SILICON RESISTORS

(POSITIVE TC THERMISTORS)

Average positive TC of + 0.7%/°C (+ 7,000 ppm) for temperature compensation and sensing.

Standard available resistances ±10% @ 25°C ±0.2°C.

	10	12	15	18	22	27	33	39	47	50	56	68
82	100	120	150	180	220	270	330	390	470	500	560	680
820	1000	1200	1500	1800	2200	2700	3300	3900	4700	5000	5600	6800
8200	10,000											

type number	wattage rating	resistance range	body dimensions: Length (inches)	Diameter (inches)
TM ¼	¼	10 ohms - 10 K	0.585 (±0.015)	0.200 (±0.015)
TM ⅛	⅛	10 ohms - 5.6 K	0.406 (±0.015)	0.140 (±0.015)
TC ⅛	⅛	10 ohms - 5.6 K	TO-5 Transistor Package	
TGX01	0.01	10 ohms - 1 K	0.060 Max.	0.040 Max.
P-100†	—		0.500 (±0.062)	0.078 (±0.010)

† Hermetically sealed glass package for instrumentation and temperature control available in resistances of 100 ohms, 500 ohms, 1,000 ohms, 2,000 ohms, 4,000 ohms ± 10% measured at 25°C.

*Trademark of TEXAS INSTRUMENTS INCORPORATED

WELDABLE LEADS

"A" nickel leads available on all film resistors, ⅛ watt through ½ watt ratings, and TM Series Sensistor Silicon Resistors.

Kovar leads protected with 40 micro inches of gold over 40 micro inches of nickel, standard on TC⅛ Sensistor Silicon Resistor.

tan-TI-cap® SOLID TANTALUM ELECTROLYTIC CAPACITORS

TYPE SCM — POLAR LINE — MILITARY TYPE CS12 & CS13 SOLID TANTALUM CAPACITORS ALSO AVAILABLE

All capacitance ratings available in ± 10% and ± 20% tolerance decades. Other parameter tolerances available on special order.

Capacitance, Voltage Ratings, Catalog Numbers

Capacitance Rating µf	50 v. at 85°C 33 v. at 125°C Catalog No.	35 v. at 85°C 23 v. at 125°C Catalog No.	20 v. at 85°C 13 v. at 125°C Catalog No.	15 v. at 85°C 10 v. at 125°C Catalog No.	10 v. at 85°C 7 v. at 125°C Catalog No.	6 v. at 85°C 4 v. at 125°C Catalog No.	Capacitance Rating µf
† .0047		SCM472FP035A2					† .0047
.0056		SCM562FP035A2					.0056
† .0068		SCM682FP035A2					† .0068
.0082		SCM822FP035A2					.0082
† .010		SCM103FP035A2					† .010
.012		SCM123FP035A2					.012
† .015		SCM153FP035A2					† .015
.018		SCM183FP035A2					.018
† .022		SCM223FP035A2					† .022
.027		SCM273FP035A2					.027
† .033		SCM333FP035A2					† .033
.039		SCM393FP035A2					.039
† .047		SCM473FP035A2					† .047
.056		SCM563FP035A2					.056
† .068		SCM683FP035A2					† .068
.082		SCM823FP035A2					.082
† .10		SCM104FP035A2					† .10
.12		SCM124FP035A2					.12
† .15		SCM154FP035A2					† .15
.18		SCM184FP035A2					.18
† .22		SCM224FP035A2					† .22
.27		SCM274FP035A2					.27
† .33		SCM334FP035A2					† .33
.39		SCM394FP035A2					.39
† .47		SCM474FP035A2					† .47
.56		SCM564FP035A2					.56
† .68		SCM684FP035A2					† .68
.82		SCM824FP035A2					.82
† 1.0	SCM105FP050A2	SCM105FP035A2	SCM105FP020A2	SCM105FP015A2	SCM105FP010A2	SCM105FP006A2	† 1.0
1.2	SCM125BP050A2	SCM125BP035A2	SCM125FP020A2	SCM125FP015A2	SCM125FP010A2	SCM125FP006A2	1.2
† 1.5	SCM155BP050A2	SCM155BP035A2	SCM155FP020A2	SCM155FP015A2	SCM155FP010A2	SCM155FP006A2	† 1.5
1.8	SCM185BP050A2	SCM185BP035A2	SCM185FP020A2	SCM185FP015A2	SCM185FP010A2	SCM185FP006A2	1.8
† 2.2	SCM225BP050A2	SCM225BP035A2	SCM225FP020A2	SCM225FP015A2	SCM225FP010A2	SCM225FP006A2	† 2.2
2.7	SCM275BP050A2	SCM275BP035A2	SCM275BP020A2	SCM275FP015A2	SCM275FP010A2	SCM275FP006A2	2.7
† 3.3	SCM335BP050A2	SCM335BP035A2	SCM335BP020A2	SCM335FP015A2	SCM335FP010A2	SCM335FP006A2	† 3.3
3.9	SCM395BP050A2	SCM395BP035A2	SCM395BP020A2	SCM395BP015A2	SCM395FP010A2	SCM395FP006A2	3.9
† 4.7	SCM475BP050A2	SCM475BP035A2	SCM475BP020A2	SCM475BP015A2	SCM475FP010A2	SCM475FP006A2	† 4.7
5.6	SCM565GP050A2	SCM565BP035A2	SCM565BP020A2	SCM565BP015A2	SCM565BP010A2	SCM565FP006A2	5.6
† 6.8	SCM685GP050A2	SCM685BP035A2	SCM685BP020A2	SCM685BP015A2	SCM685BP010A2	SCM685FP006A2	† 6.8
8.2	SCM825GP050A2	SCM825GP035A2	SCM825BP020A2	SCM825BP015A2	SCM825BP010A2	SCM825BP006A2	8.2
† 10	SCM106GP050A2	SCM106GP035A2	SCM106BP020A2	SCM106BP015A2	SCM106BP010A2	SCM106BP006A2	† 10
12	SCM126GP050A2	SCM126GP035A2	SCM126BP020A2	SCM126BP015A2	SCM126BP010A2	SCM126BP006A2	12
† 15	SCM156GP050A2	SCM156GP035A2	SCM156BP020A2	SCM156BP015A2	SCM156BP010A2	SCM156BP006A2	† 15
18	SCM186GP050A2	SCM186GP035A2	SCM186GP020A2	SCM186BP015A2	SCM186BP010A2	SCM186BP006A2	18
† 22	SCM226HP050A2	SCM226GP035A2	SCM226GP020A2	SCM226BP015A2	SCM226BP010A2	SCM226BP006A2	† 22
27		SCM276HP035A2	SCM276GP020A2	SCM276GP015A2	SCM276BP010A2	SCM276BP006A2	27
† 33		SCM336HP035A2	SCM336GP020A2	SCM336GP015A2	SCM336BP010A2	SCM336BP006A2	† 33
39		SCM396HP035A2	SCM396GP020A2	SCM396GP015A2	SCM396BP010A2	SCM396BP006A2	39
† 47		SCM476HP035A2	SCM476GP020A2	SCM476GP015A2	SCM476GP010A2	SCM476BP006A2	† 47
56			SCM566HP020A2	SCM566GP015A2	SCM566GP010A2	SCM566BP006A2	56
† 68			SCM686HP020A2	SCM686GP015A2	SCM686GP010A2	SCM686GP006A2	† 68
82			SCM826HP020A2	SCM826HP015A2	SCM826GP010A2	SCM826GP006A2	82
†100			SCM107HP020A2	SCM107HP015A2	SCM107GP010A2	SCM107GP006A2	†100
120			SCM127HP020A2	SCM127HP015A2	SCM127GP010A2	SCM127GP006A2	120
†150				SCM157HP015A2	SCM157HP010A2	SCM157GP006A2	†150
180					SCM187HP010A2	SCM187GP006A2	180
†220					SCM227HP010A2	SCM227HP006A2	†220
270						SCM277HP006A2	270
†330						SCM337HP006A2	†330

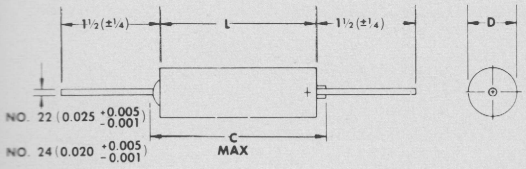
† For ±20% tolerance, change last digit of catalog number from 2 to 4. To specify with insulating sleeves, change next to last digit of catalog number from A to: "D" for Mylar.

"PARENT DEVICE" SYSTEM EXPLANATION

TI manufactures only the highest rated voltages for any given capacitance rating and case size. These "parent devices" are indicated by colored background. For example, all 1.0 µf capacitors in the "F" case are 35-volt units. These will meet your needs for 6, 10, 15 and 20-volt usage as well as 35-volt applications. This allows you to reduce and simplify your capacitor inventory, to qualify for larger quantity discounts and often provides an extra voltage margin for added reliability as well.

Catalog Number Example	Type	Value	Case Size	Polar	Rated Voltage	Tolerance
SCM105FP006A2	SCM	105 = 1µf	F	P	006	2 = 10%

CS12, CS13, AND SCM DIMENSIONS AND FEATURES



Case Size	D +0.010 −0.005	L ±0.031	C Max.	Wire Size AWG	with insulating sleeves D ±0.010	L ±0.031	C Max.	Avg. Wt. gms
F	0.125	0.250	0.422	24	0.135	0.286	0.422	0.4
B	0.175	0.438	0.610	24	0.185	0.474	0.610	1.2
G	0.279	0.650	0.822	22	0.289	0.686	0.822	2.0
H	0.341	0.750	0.922	22	0.351	0.786	0.922	3.4

- Wide range of military and industry standard capacitance-voltage ratings in 4 standard case sizes.
- Operating temperature range: −80°C to +85°C at rated voltage, +125°C at ⅔ rated voltage.
- Surge voltage rating: 130% of rated working voltage.
- All standard capacitance ratings available from .0047 µf thru 330 µf.
- Solid electrolyte eliminates liquid leakage and dehydration.
- Life Test—2000 hrs. at rated voltages and elevated temperatures.
- Hermetically sealed, corrosion resistant case.
- High parameter stability with respect to time and temperature
- Reverse voltage capability.
- Performance-proved in exacting military, commercial, and industrial applications.
- Lot number marked on each device.

Epoxy Encapsulated Capacitors — TYPE ECM

- Solid electrolyte — no liquids, eliminates leakage, prevents dehydration, provides indefinite shelf life
- High parameter stability with respect to time and temperature
- Small size — up to 80% smaller than comparable aluminum electrolytic capacitors
- Economical — priced competitively with aluminum electrolytics, lower cost than hermetic solid tantalums
- No preconditioning — ready for instant application after long non-operating periods
- Tough encapsulation — protects against moisture, contamination physical abuse
- Ideal for automatic insertion

Standard values are shown in µf

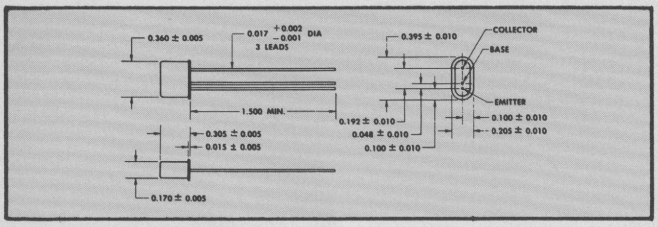
±10% & ±20% Tolerances:						+50%/−10%				
.10	.33	1.0	3.3	10.0	33.0	1	4	8	20	50
.15	.47	1.5	4.7	15.0	47.0	2	5	10	25	75
.22	.68	2.2	6.8	22.0		3	6	15	35	100

TYPE ECM — MOLDED EPOXY

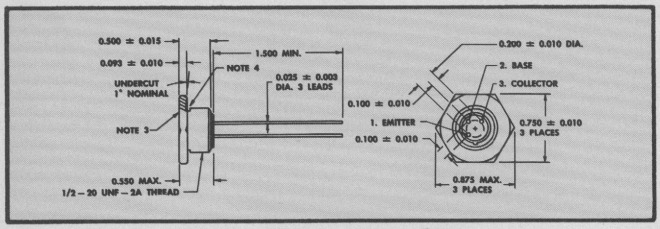
Case Size	Capacitance Range — µf 3 Volts	6 Volts	10 Volts	15 Volts	20 Volts	25 Volts	35 Volts	Dimensions Inches Length ±.030	Dia. ±.020	Avg. Wire Size
W	.10—8	.10—8	.10—5	.10—3.3	.10—2.2	.10—2	.10—1	0.390	0.138	22
X	10—100	10—50	6—33	4—22	3—15	2.2—10	1.5—6.8	0.562	0.190	22

CASE OUTLINES

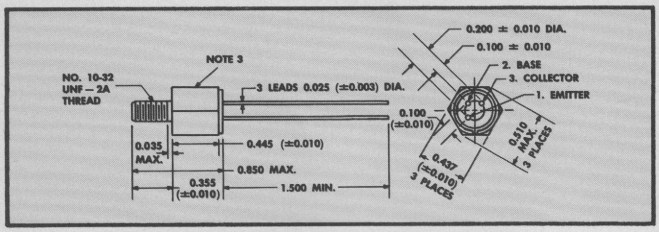
(All dimensions in inches unless otherwise specified)
*T.M. of Texas Instruments Incorporated



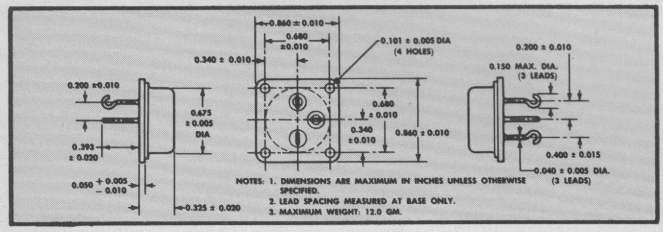
A Triode Welded Seal



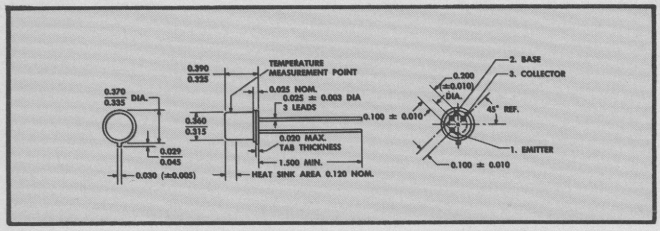
B Round Welded Triode with Heat Sink



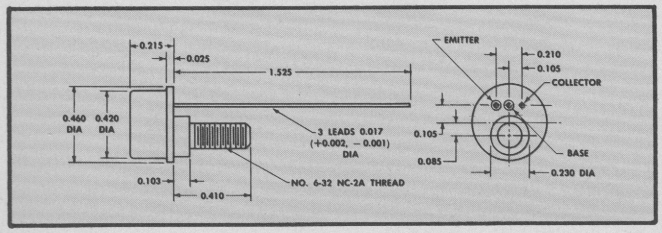
C Round Welded Triode with Stud Heat Sink



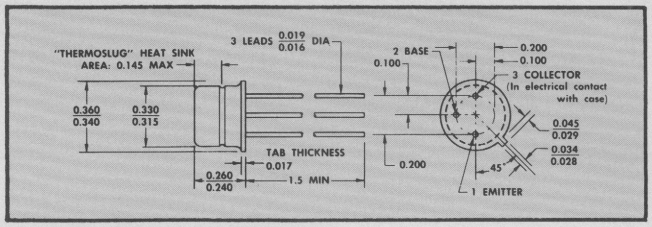
D TO-53



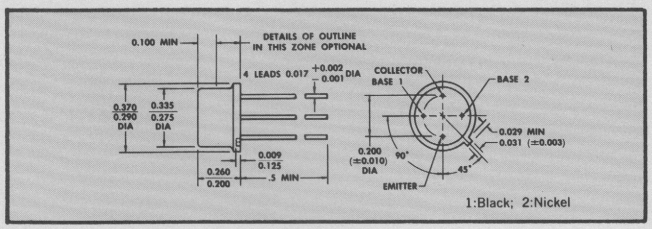
E Tall Round Welded Triode with Internal Heat Sink



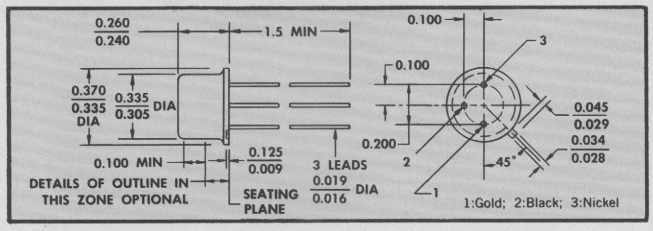
F TO-57



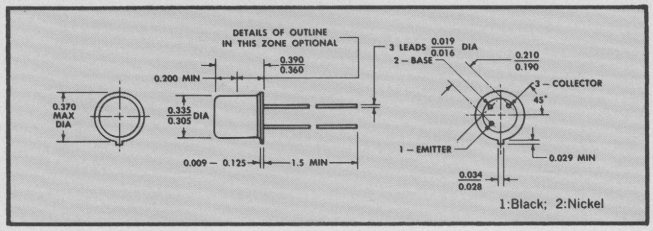
G TO-5 THERMOSLUG*



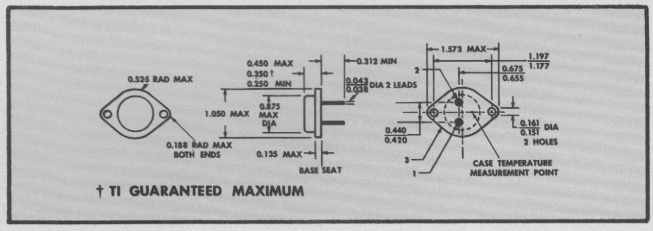
H TO-12



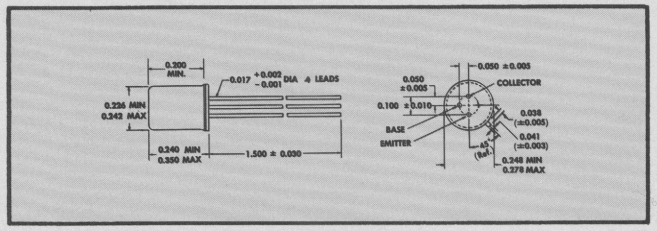
I TO-5



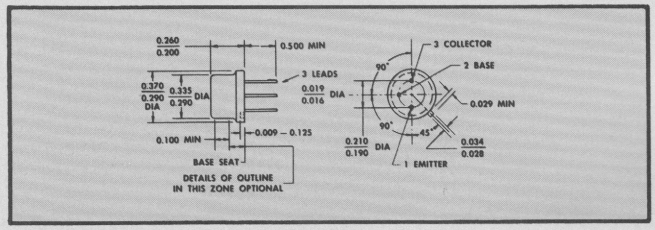
J TO-11



K TO-3

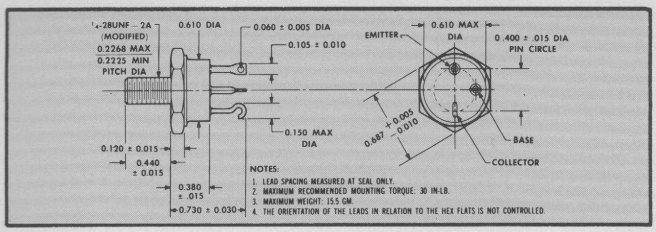


L Miniature Tall Round Welded Triode

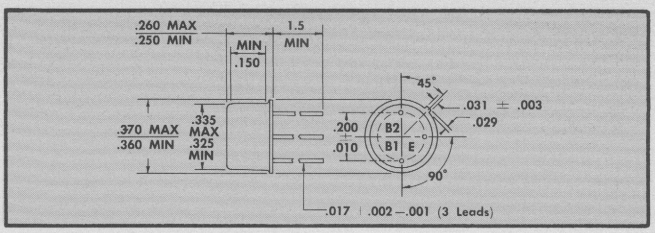


M Short Round Welded Triode

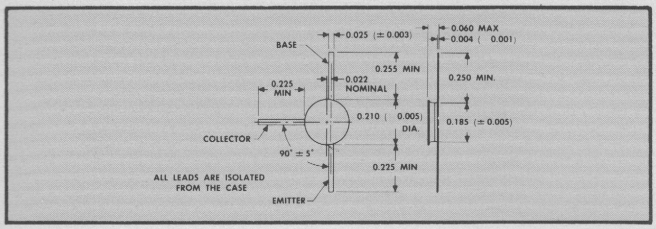
CASE OUTLINE DRAWINGS (All dimensions in inches unless otherwise specified)



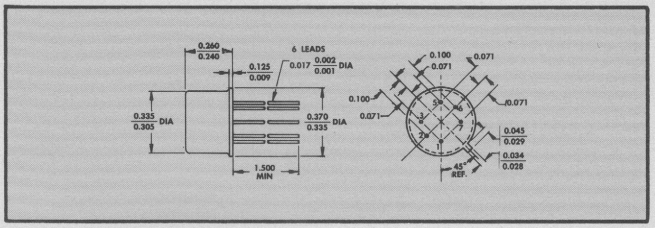
N TO-61



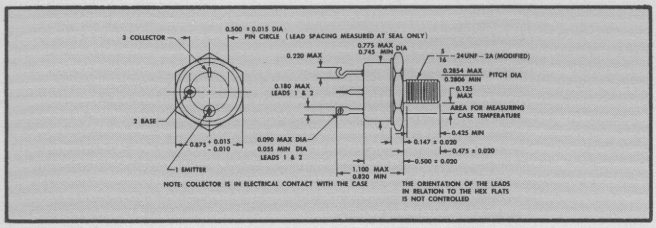
U Unijunction Transistor



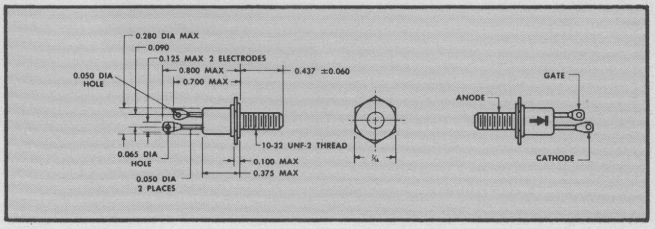
O TO-50



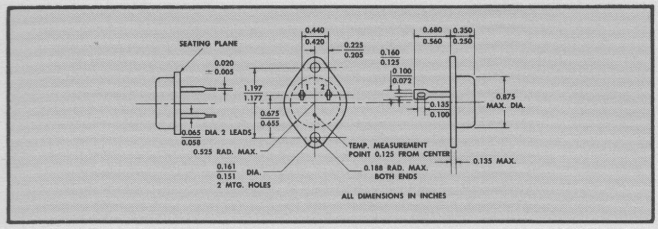
V Welded Dual Triode


0.500 ± 0.015 DIA PIN CIRCLE (LEAD SPACING MEASURED AT SEAL ONLY)
3 COLLECTOR
0.775 MAX DIA
0.745 MIN
0.220 MAX
1/4-24UNF-2A (MODIFIED)
0.3854 MAX PITCH DIA
0.3806 MIN
0.180 MAX LEADS 1 & 3
0.125 MAX
AREA FOR MEASURING CASE TEMPERATURE
2 BASE
0.875 +0.015 −0.010
0.090 MAX DIA
0.055 MIN DIA LEADS 1 & 2
0.435 MIN
0.147 ± 0.030
0.475 ± 0.020
0.500 ± 0.020
1 EMITTER
1.100 MAX
0.830 MIN
NOTE: COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE
THE ORIENTATION OF THE LEADS IN RELATION TO THE HEX FLATS IS NOT CONTROLLED

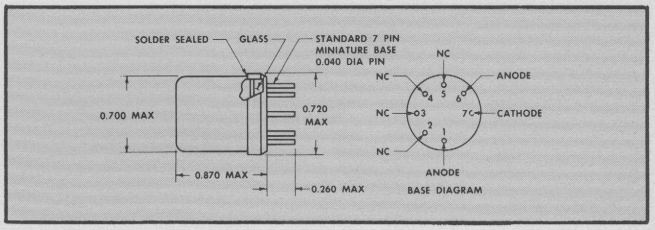
P TO-63



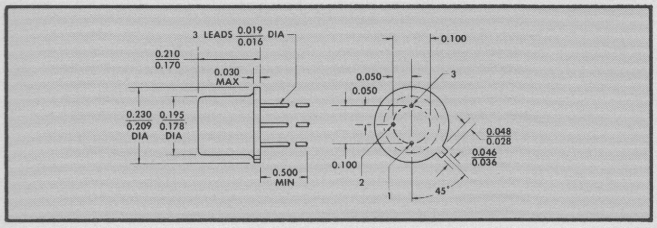
AA TO-64



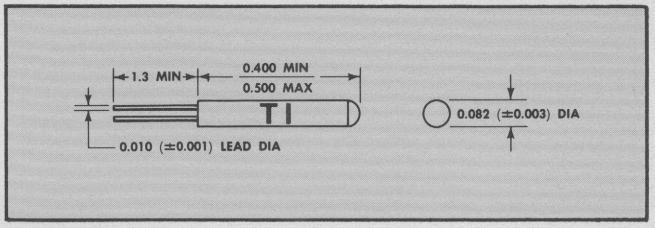
Q Diamond Germanium High Power



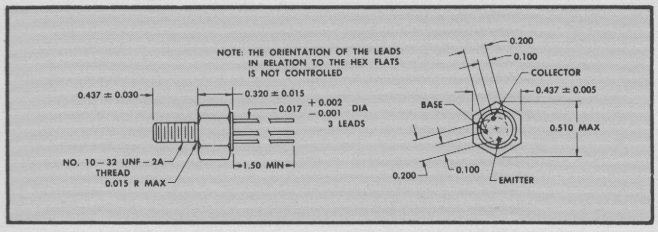
BB Plug-in-Standard 7-pin Miniature Base



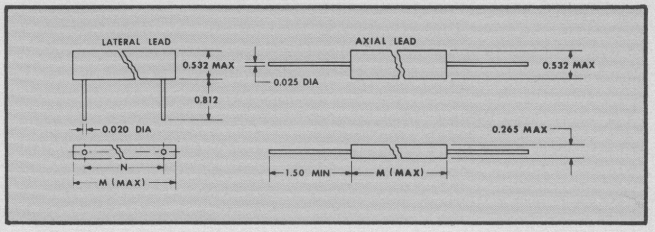
R TO-18



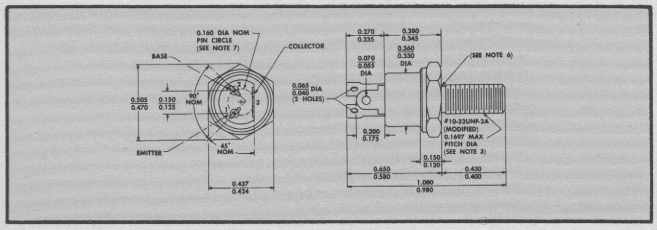
CC Photo Device



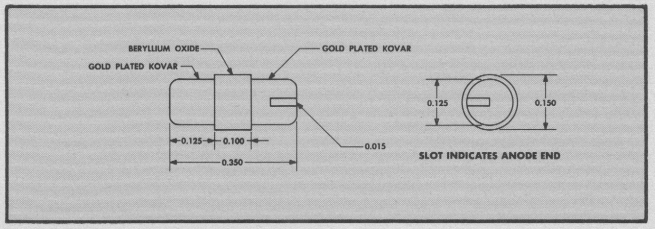
S Double-ended Stud THERMOSLUG* Silicon Power



DD Diode Stacks

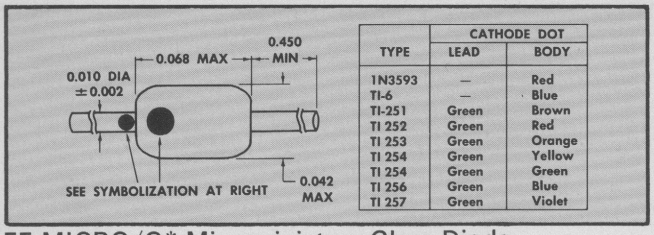


T Double-ended Stud Silicon Power



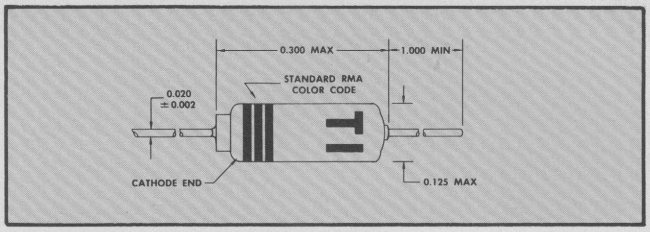
EE Microwave Package

CASE OUTLINE DRAWINGS (All dimensions in inches unless otherwise specified)

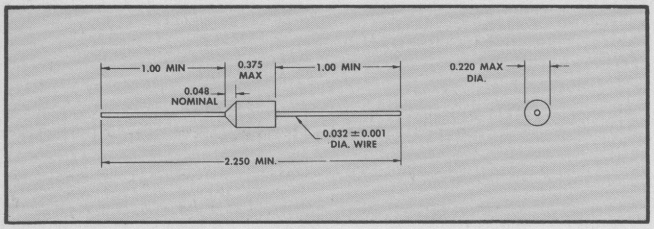


TYPE	CATHODE DOT	
	LEAD	BODY
1N3593	—	Red
TI-6	—	Blue
TI-251	Green	Brown
TI 252	Green	Red
TI 253	Green	Orange
TI 254	Green	Yellow
TI 254	Green	Green
TI 256	Green	Blue
TI 257	Green	Violet

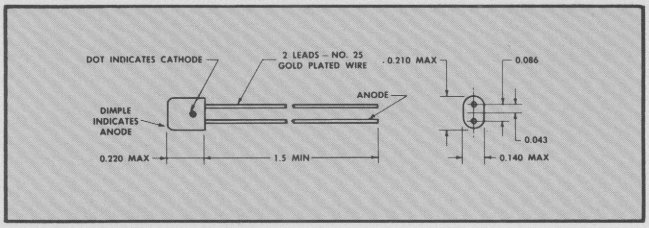
FF MICRO/G* Microminiature Glass Diode



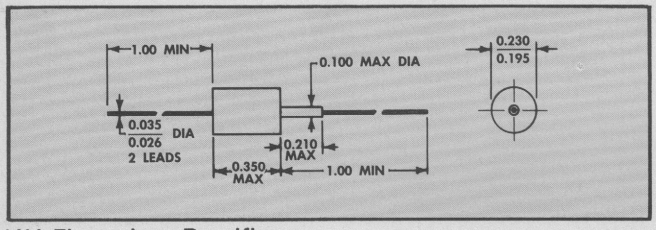
MM MOLY/G* Hard Glass Diode



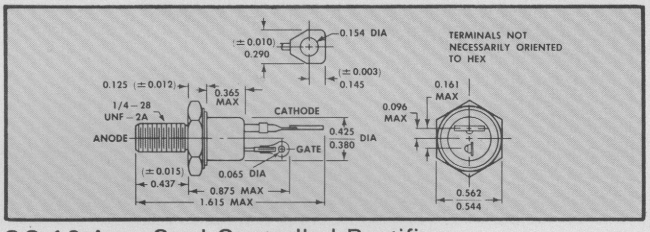
GG Epoxy Rectifier



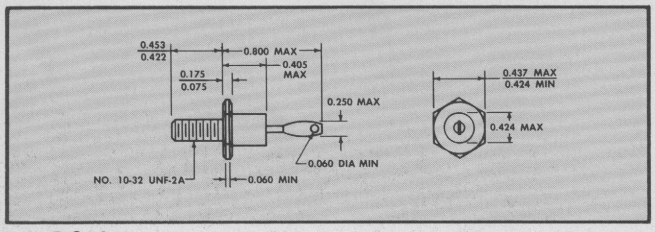
NN Metal Case Diode



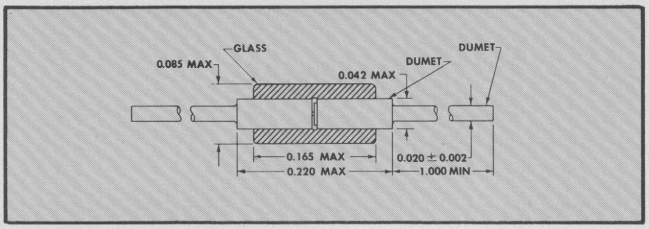
HH Flangeless Rectifier



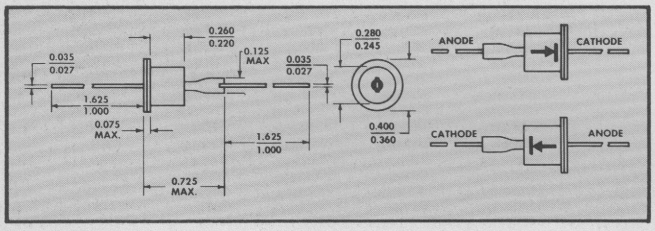
OO 16 Amp Stud Controlled Rectifier



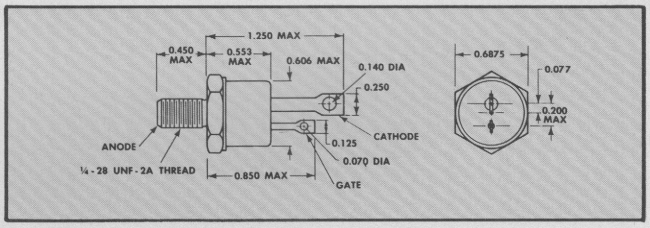
II DO-4



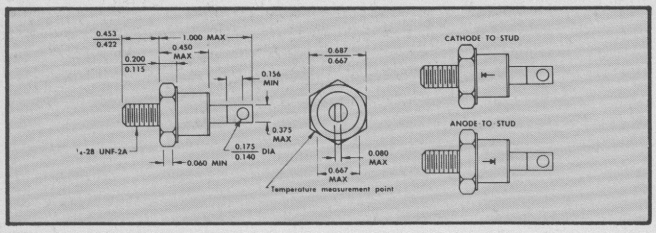
PP UNI/G* Glass Diode



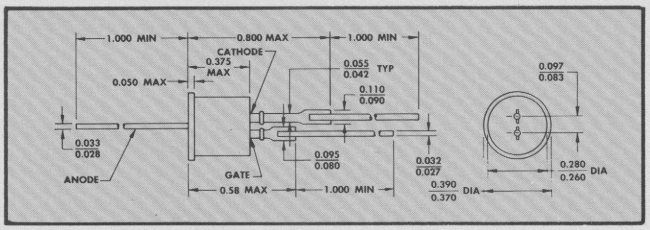
JJ DO-1



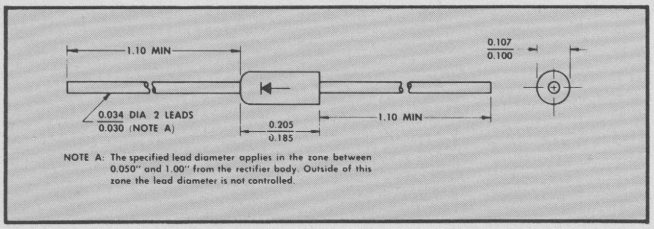
QQ High-power Stud Controlled Rectifier



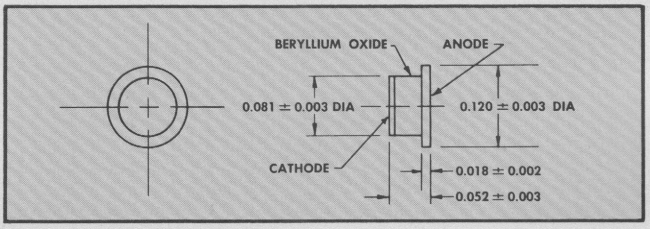
KK Stud Rectifier



RR In-line Top-hat Controlled Rectifier

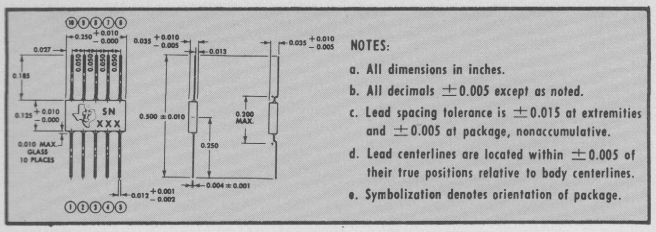


LL Axial Lead Rectifier

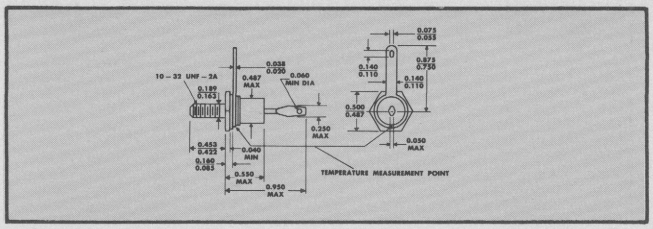


SS Microwave Package

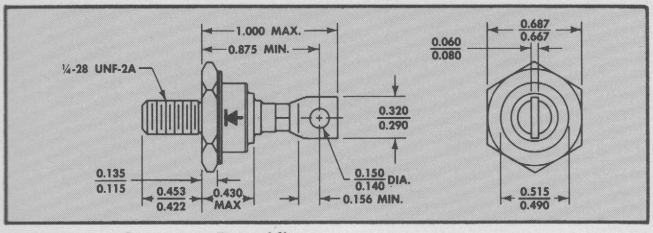
CASE OUTLINE DRAWINGS (All dimensions in inches unless otherwise specified)


SN
XXX
NOTES:
a. All dimensions in inches.
b. All decimals ±0.005 except as noted.
c. Lead spacing tolerance is ±0.015 at extremities and ±0.005 at package, nonaccumulative.
d. Lead centerlines are located within ±0.005 of their true positions relative to body centerlines.
e. Symbolization denotes orientation of package.

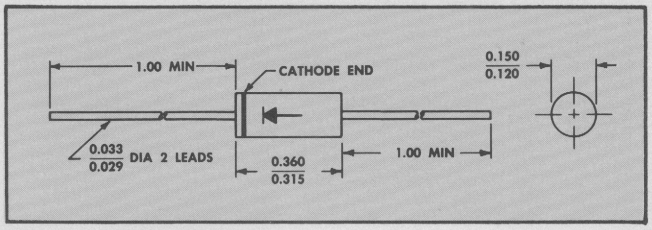
TT TO-89 10-lead Integrated Circuit



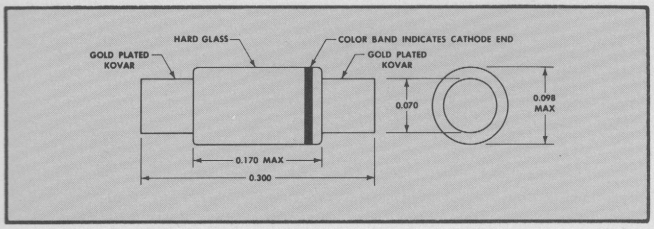
EEE DO-10 Electrically Isolated Top-hat Rectifier



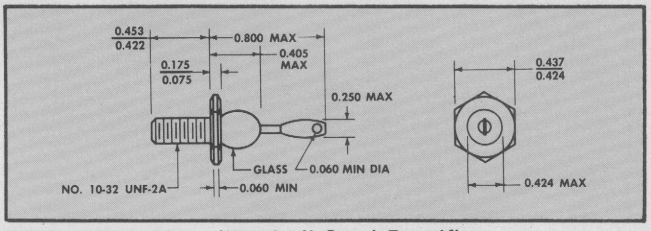
UU High-Current Rectifier



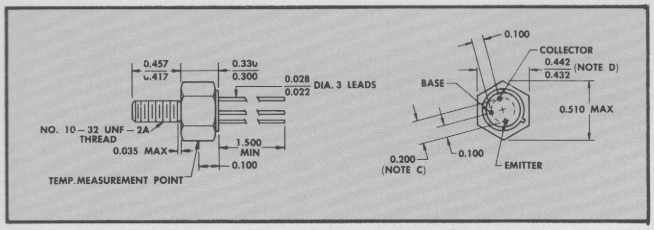
FFF Axial-lead Glass



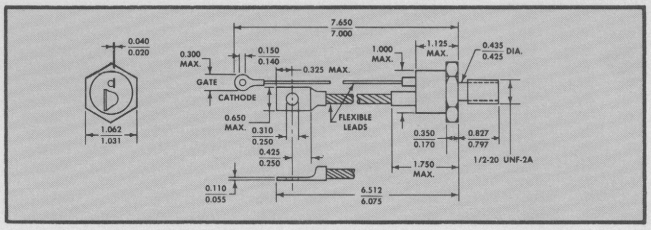
VV Microwave Package



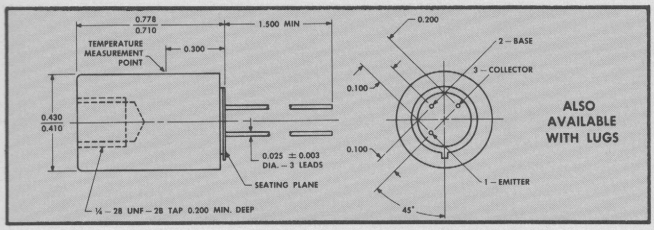
GGG DO-4 Glass "Derby" Stud Rectifier



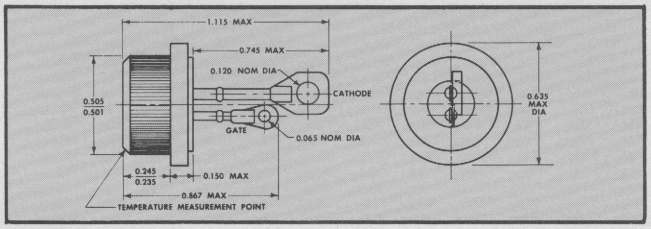
AAA Double-ended Stud Germanium Power



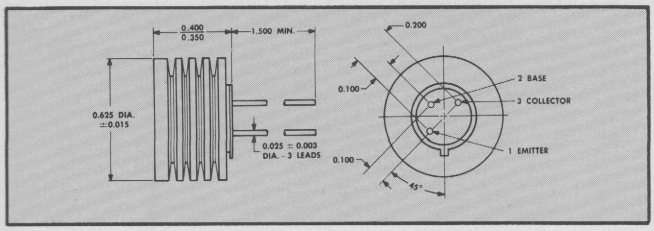
HHH TO-49 High-power Stud SCR



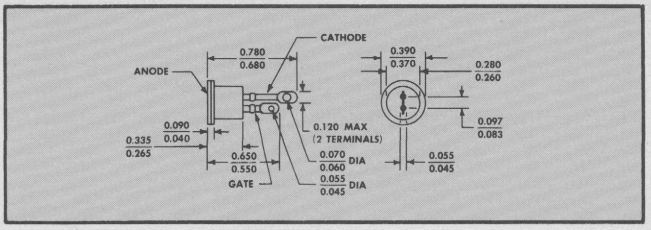
BBB Round Welded Triode • Cylindrical Heat Sink



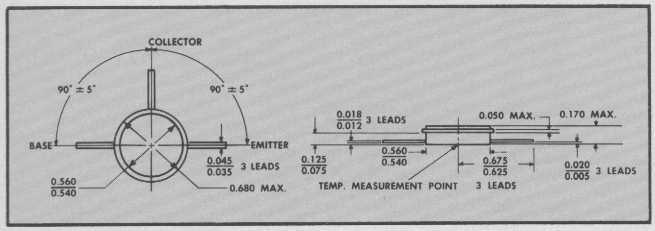
III Press-fit SCR



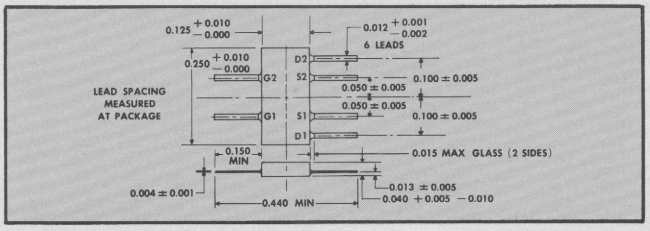
CCC Round Welded with Free-air Radiator



JJJ Flat-base Top-hat SCR

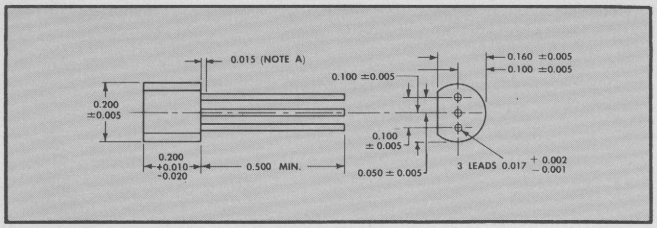


DDD Isolated THIN-PAC*

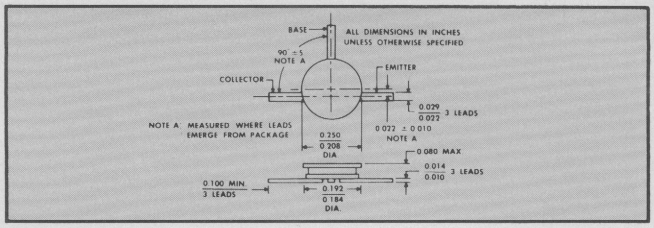


KKK (TO-89 Dimensions)

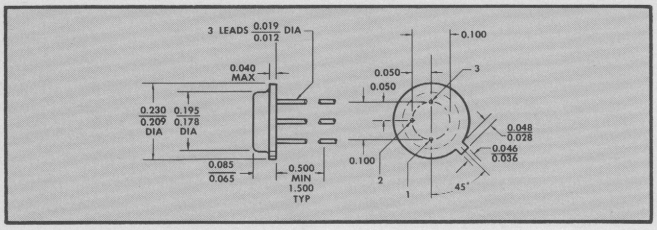
CASE OUTLINE DRAWINGS (All dimensions in inches unless otherwise specified)



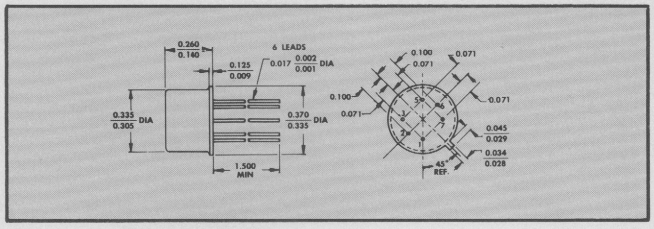
LLL SILECT* Silicone Encapsulation



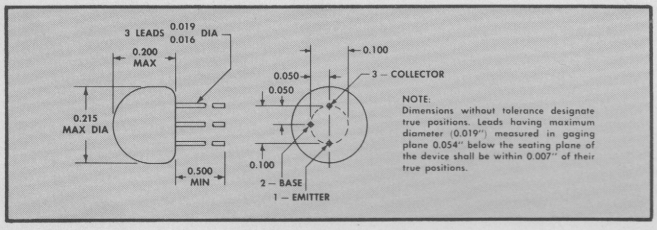
SSS TI-Line



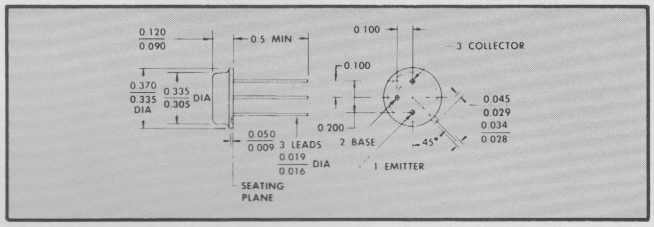
MMM TO-46 Package



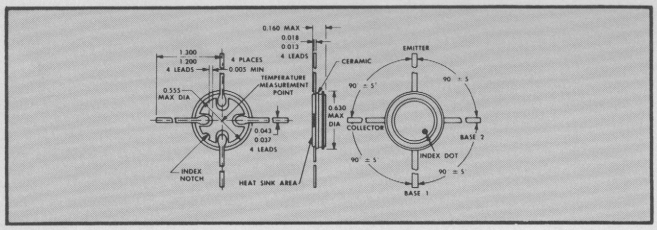
TTT Low-Profile Dual


3 LEADS 0.019 0.016 DIA
0.200 MAX
0.215 MAX DIA
0.500 MIN
0.050
0.050
0.100
3 — COLLECTOR
0.100
2 — BASE
1 — EMITTER
NOTE:
Dimensions without tolerance designate true positions. Leads having maximum diameter (0.019") measured in gaging plane 0.054" below the seating plane of the device shall be within 0.007" of their true positions.

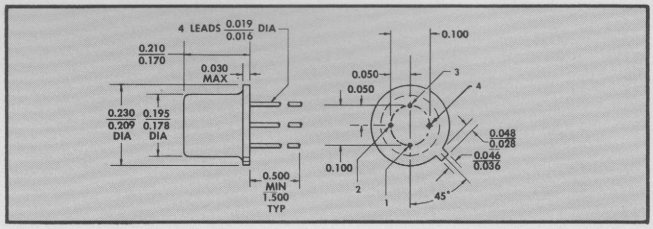
NNN Epoxy Plastic Encapsulation



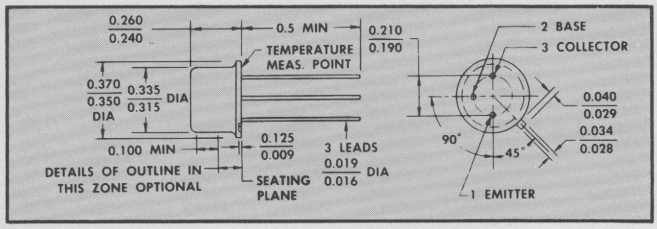
UUU Special Low Profile



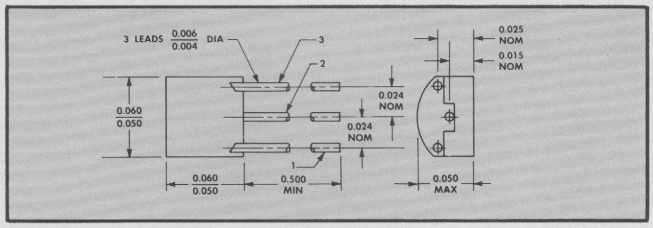
OOO Isolated Darlington THIN-PAC*



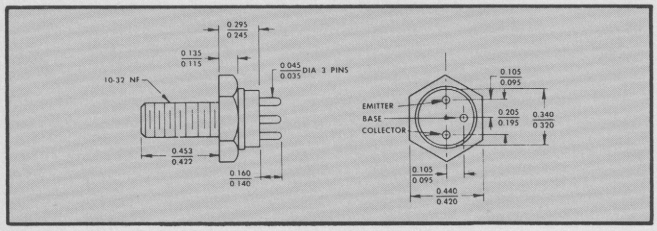
VVV TO-72



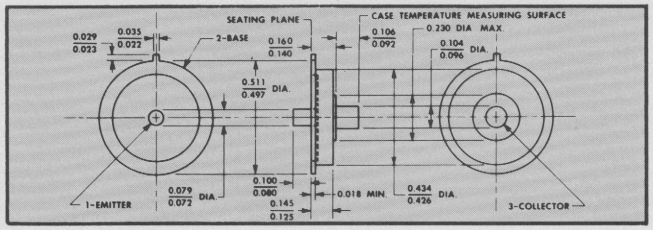
PPP TO-39



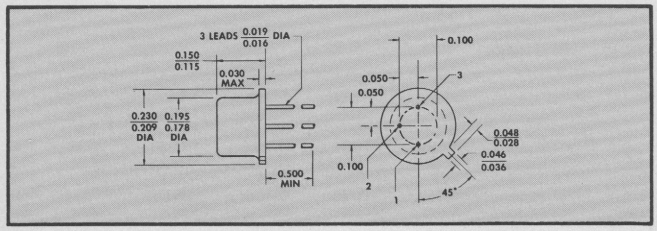
WWW Chip-Pak



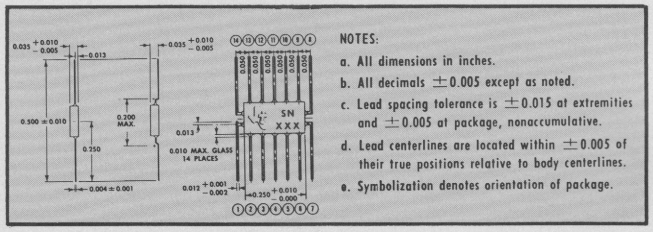
QQQ TO-60 Low-Profile Isolated Stud



XXX Coaxial



RRR TO-52


0.035 +0.010 −0.005
0.013
0.035 +0.010 −0.005
0.500 ± 0.010
0.200 MAX.
0.750
0.004 ± 0.001
0.010 MAX. GLASS 14 PLACES
0.012 +0.001 −0.002
0.250 +0.010 −0.000
SN XXX
NOTES:
a. All dimensions in inches.
b. All decimals ±0.005 except as noted.
c. Lead spacing tolerance is ±0.015 at extremities and ±0.005 at package, nonaccumulative.
d. Lead centerlines are located within ±0.005 of their true positions relative to body centerlines.
e. Symbolization denotes orientation of package.

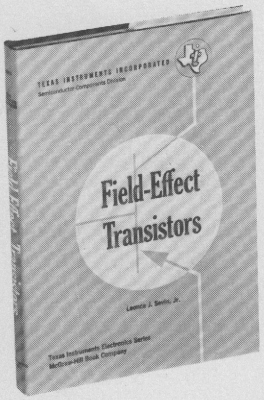
YYY TO-84 14-lead Integrated Circuit

index to device numbers

Only the basic device number is shown here. Data for other versions — "A", "B", "USA", "JAN", etc. — will be found immediately adjacent data for the basic number.

Type	Page
1N251	20
1N253-6	28
1N332-49	28
1N440-5	28
1N456-9	21
1N461-4	21
1N482-8	21
1N530-40	28
1N547	28
1N550-5	28
1N588, 9	28
1N599	28
1N600-14	28
1N625-9	20
1N643	20
1N645-9	21
1N658	20
1N659-63	20
1N702-7	23
1N709-17	23
1N718-37	24
1N746-59	24
1N761-9	24
1N914-17	20
1N957-84	24
1N1095, 6	28
1N1100-5	28
1N1115-20	28
1N1124-8	28
1N1130, 1	28
1N1487-92	28
1N1581-6	28
1N1587	29
1N1612-6	29
1N1692-7	29
1N1816-36	22
1N1816-36	22
1N2008-12	22
1N2069-71	29
1N2117	29
1N2175	30
1N2498, 9	22
1N2500	22
1N2609-17	29
1N2970-7	22
1N2979, 80	22
1N2982	22
1N2984-6	22
1N2988, 9	22
1N2995	22
1N2997	22
1N2999	22
1N3000-5	22
1N3007-12	22
1N3046-51	23
1N3064	20
1N3070	20
1N3189-91	29
1N3506-13	24
1N3515-34	25
1N3593	20
1N3775	29
1N3874-93	29
1N3909-13	29
1N4001-7	29
1N4099	25
1N4100-6	25
1N4158-93	23
1N4360	25
1N4364-9	29
1N4370-2	25
1N4374	29
1N4383-5	29
1N4537-40	29
1N4831-60	23
2N117-20	10
2N243-4	10
2N250, 1	19
2N264	10
2N332-6	10
2N339-43	10
2N358	17
2N377, 8	10
2N388	17
2N389	14
2N395-7	17
2N398	18
2N404	17
2N416, 7	17
2N424	14
2N426-8	17
2N456-8	19
2N470-80	10
2N489-94	32
2N497, 8	14
2N511-4	19
2N541-3	10
2N594-6	17
2N650-2	16
2N656, 7	14
2N658-62	16
2N681-9	27
2N696-9	11
2N702, 3	11
2N705	17
2N706	12
2N708, 9	12
2N710, 1	17
2N715, 6	13
2N717-20	11
2N721, 2	12
2N726, 7	13
2N730, 1	11
2N734-6	13
2N738-40	13
2N743, 4	12
2N753	12
2N759, 60	13
2N780	13
2N797	17
2N849-52	34
2N870, 1	11
2N876-81	27
2N884-9	27
2N910-12	11
2N914	12
2N916-8	13
2N929, 30	13
2N956	11
2N960-75	17
2N985	17
2N997	32
2N1021, 2	19
2N1038-46	19
2N1047-50	14
2N1131, 2	12
2N1141-3	16
2N1149-56	10
2N1195	16
2N1247, 8	13
2N1252, 3	12
2N1273, 4	16
2N1276-9	10
2N1300-9	17
2N1310-2	18
2N1370-83	16
2N1385	16
2N1404	17
2N1420	11
2N1487-90	14
2N1507	11
2N1539-43	19
2N1564-66	13
2N1572-4	13
2N1586-94	10
2N1595-9	27
2N1600-4	27
2N1605	17
2N1613	11
2N1671	32
2N1683	17
2N1711	11
2N1714-25	14
2N1770-6	27
2N1808	17
2N1842-50	27
2N1853, 4	18
2N1889, 90	11
2N1893	11
2N1907, 8	19
2N1929-35	27
2N1936, 7	14
2N1973-5	11
2N1993-9	18
2N2000, 1	18
2N2060	32
2N2150, 1	14
2N2160	32
2N2188-91	16
2N2192-4	11
2N2217-22	11
2N2223	32
2N2243	11
2N2368, 9	12
2N2386	33
2N2387-90	34
2N2393-6	34
2N2410	12
2N2411, 2	13
2N2415, 6	16
2N2432	33
2N2453	32
2N2481	12
2N2483, 4	13
2N2497-9	33
2N2500	33
2N2537-40	12
2N2552-67	19
2N2586	13
2N2604, 5	13
2N2631	15
2N2635	18
2N2639-44	32
2N2653	27
2N2659-70	19
2N2679-90	27
2N2692-4	12
2N2695-6	12
2N2802-7	32
2N2861-2	13
2N2863-5	13
2N2876	15
2N2883-4	13
2N2894	13
2N2904-7	12
2N2944-6	33
2N2987	14
2N2988-94	15
2N2996-9	16
2N3001-8	27
2N3009-15	12
2N3012	13
2M3033-5	13, 34
2N3036	11
2N3037-40	34
2N3043-52	34
2N3114	11
2N3146, 7	19
2N3252, 3	12
2N3303	12
2N3304	13
2N3328-32	33
2N3333-6	33, 34
2N3347-52	32
2N3418-21	15
2N3444	12
2N3551, 2	15
2N3554	12
2N3555-62	27
2N3570-2	13
2N3573-5	33
2N3576	13
2N3680	32
2N3702-12	35
2N3821-3	33
2N3824	33
2N3825-8	35
2N3829-32	12
2N3836-7	15
2N3846-9	15
2N3838	32
2N3909	33
3N74-9	34
3N108-11	34
600, 1	21
604	21
606	21
608	21
610	21
612	21
614	21
616	21
618	21
620	21
622	21
624	21
650-3	25
650C0-7	25
651C0-9	25
652C0-9	25
653C0-9	25
654C9	25
655C9	25
A580-89	26
A610-2	26
A900-3	26
A905-8	26
H11	30
H35	30
H38	30
H60-2	30
J503-11	10
LS222	30
LS400	30
LS515	30
LSX600	30
LSX900	30
PEX3003	31
TI2	20
TI6-10	20
TI40A0 4	27
TI42, 3	27
TI71-5	21
TI45A0-4	27
TI140A0-4	27
TI156	19
TI158L	19
TI158-62	19
TI251-7	21
TI390, 1	35
TI400-3	35
TI407-9	35
TI411	35
TI419	35
TI420, 1	34
TI424-5	34
TI428, 9	34
TI432, 3	34
TI482-4	11
TI485	12
TI486, 7	14
TI490	13
TI492-6	10
TI539, 40	19
TI550, 1	22
TI610-2	32
TI1121-6	14
TI1131-6	14
TI1141-6	14
TI1151-6	14
TI3010-14	27
TI3027-31	19
TI3037-42	27
TIC01-5	27
TIC11-5	27
TIC20-3	27
TID11-20	20
TIS05	33
TIS14	33
TIS18	35
TIS22-4	13, 34
TIS25-7	33
TISX11	33
TIV01-4	26
TI300-3	26
TIX95	27
TIX155	14
TIX895	17
TIX3016	13
TIX3024	16
TIXD21-6	20
TIXL01-3	31
TIXL51-3	31
TIXM01-8	35
TIXM201-6	35
TIXP07	15
TIXS09-10	13
TIXS12-3	13
TIXS28-31	35
W463A-F	27
XD500-2	26
All Capacitors (SCM, CS, ECM)	37
All Resistors (CG, CD, CDM, CR, GP, MM, MC, TM, TC, TG)	36
All Semiconductor Networks	7, 8, 9, 10
All Optoelectronic devices	30, 31

TI Microlibrary Books for Creative Circuit Designers



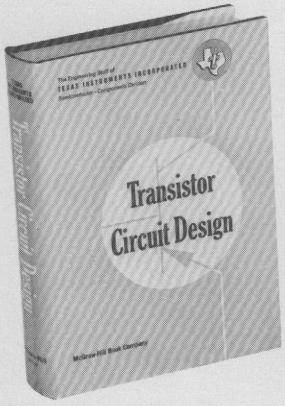
Field-effect Transistors • L. J. Sevin

138 pages • 137 illustrations • published April '65 • $10.00

The first full-length text devoted exclusively to field-effect transistors, this work gives comprehensive coverage of theory, design philosophy, and practical applications of FET's. Beginning with a presentation of physical theory based on Maxwell's Equations, the book uses a lumped linear model to describe the circuit behavior of the FET. Much attention is devoted to detailed explanations of the electrical characteristics of FET's that are significant in circuit applications. Most of the typical applications for FET's are described and illustrated by circuit diagrams.

Chapter Titles

Theory of the Unipolar Field-effect Transistor
FET Characteristics
FET's in Low-level Linear Circuits
FET's in Non-linear Circuits
Blue Skies Dept: The Power FET
Further Applications
FET's in Integrated Circuits



Transistor Circuit Design

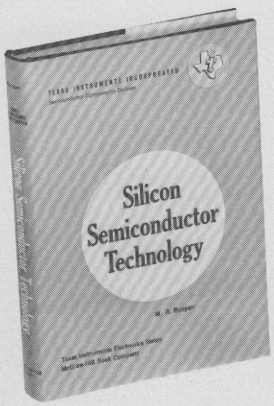
523 pages • 526 illustrations • published Jan. '63 • $15.00

Just a few of the many topics presented . . .

Switching characteristics — Pulse testing techniques — Thermal stability — D-C measurements — Small-signal parameter measurements and test circuits — High-frequency measurements — Heat dissipation — Input stage design — Ring modulators — Photodiodes and phototransistors — Modulated carrier systems — Gain and output power — The ideal amplifier — Base bias circuits — Driver transformer design — Transistor upper noise corner frequency — Tank circuit — VHF mixers — Frequency doublers — Reverse AGC — Bistable (Flip-flop) multivibrator — Saturated transistor logic circuits — R-C time base generators — Load line analysis — Series switching circuit — Analog vs. Digital servo-mechanisms

This runaway bestseller has now sold over 50,000 copies and is being translated into French, Italian, Spanish, Hungarian, and Japanese. You probably own a copy . . . if you don't, you'll want to add this handy reference book to your desk-top library.

Transistor Circuit Design covers the most common problems that confront circuit designers, from interpretation of data sheet information to design procedures for VHF power stages . . . from techniques for measuring transistor parameters, to discussions of the effects of complex thermal impedances on circuit stability. A practical work-a-day book, it presents detailed design procedures for a great variety of circuits.



Silicon Semiconductor Technology • W. R. Runyan

256 pages • 301 illustrations • published May '65 • $16.50

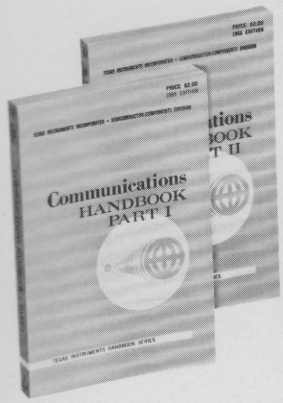
If you're a creative designer, you're not content just to string black boxes together . . . you want the "inside story" so you can exploit the potential of every component. "Silicon Semiconductor Technology" gives you the inside story — it's the first book in the field to present comprehensive and authoritative discussions on every aspect of silicon as a semiconductor. A glance at the table of contents tells you that this book is valuable not only to the designer of devices, but to the designer of circuits and systems as well.

Contents

An Historical Note
Silicon Manufacturing Processes
Silicon Casting Processes
Crystal Growth
Crystal Habit and Orientation
Doping Processes
Diffusion
Electrical Properties
Optical Properties
Miscellaneous Physical Properties and Processes
Metallurgy

Communications Handbook (in two parts)

366 pages total • 417 illustrations • published Mar. '65 • $3.50/set



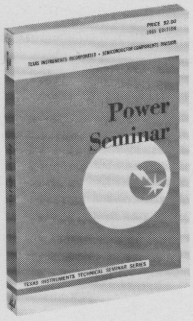
If you're engaged in any phase of communications from RF to UHF and from CQ to QC, you'll be interested in these new paperbacks.

Chapter Titles

New Communications Devices
Dependence of Transistor y Parameters on Bias, Frequency, and Temperature
Typical y Parameter Data
Power Gain and Stability in Linear Active Two-ports
High-frequency Amplifier Design Using Admittance Parameters
Small-signal UHF Amplifier Design
Field-effect Transistors for Low-level Circuits
Dependence of Field-effect Transistor Characteristics on Temperature
Dual Transistors in Low-level Circuits
Low-level Operation of the 2N929 and 2N930
High Input Impedance Techniques
Noise Characterization
Transistor Gain Control
RF Harmonic Oscillators
Transistors in Wide-band Low-distortion Amplifiers
VHF and UHF Amplifiers and Oscillators Using Silicon Transistors
Causes of Noise
Transistor Noise Figure
Communications Circuit Applications
Device Nomenclature and Standard Test Circuits
Noise Figure Measurement
Power Oscillator Test Procedure

Power Seminar

214 pages • 149 illustrations • published Nov. '64 • $2.00



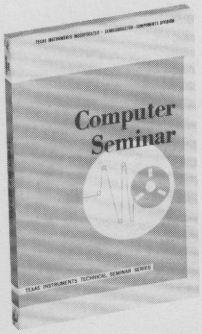
The lecture notes used in TI's 1964 Power Seminar have proved so popular that we are now incorporating this book into the Microlibrary. You may have a copy of the "white-cover version" already. If not, you'll find "Power Seminar" full of typical applications and fabrication information on power transistors, SCR's, and GCS's.

Chapter Titles

High Frequency Silicon Power Transistors: Characteristics and Applications
Silicon PNP Planar-epitaxial Power Transistors
The NPN Planar-epitaxial Power Transistor
High Power Switching with Silicon Devices
Some Aspects of Silicon Power Device Fabrication
Germanium Power Transistor Design and Fabrication
High-power Silicon Controlled Rectifiers
SCR-controlled D-C Shunt Motors
Half Wave Reversing Control Circuit for D-C Motors

Computer Seminar

127 pages • 106 illustrations • revised May '65 • $2.00



Many advanced concepts in computer technology are presented in TI's 1965 Computer Seminar. Even if you can't attend one of our seminars, you can get most of the information from this paperback, an updated version of the 1964 edition.

Chapter Titles

Magnetic Thin Films
Magnetic Film Memory Systems
Semiconductor Network Technology
A Planar Germanium 3-Gc Ultra-fast Switching Transistor
High-speed Logic Gates

Address orders to: Texas Instruments Incorporated
Post Office Box 5012
Dallas, Texas 75222
Attn: Jack Miller MS 75

...and watch for more titles now in preparation

Alabama — Huntsville **Arizona** — Phoenix **California** — Hollywood, Palo Alto, San Diego, Santa Ana, Inglewood
Florida — Orlando **Illinois** — Chicago **Iowa** — Cedar Rapids **Massachusetts** — Wellesley Hills **Michigan** — Southfield
Minnesota — St. Paul **New Jersey** — Union **New York** — Endicott, Garden City Long Island, Poughkeepsie, Rochester, Syracuse
Ohio — Cleveland, Dayton **Pennsylvania** — Bala Cynwyd **Texas** — Dallas, Houston **Washington** — Bellevue
Washington, D. C. **Argentina** — Buenos Aires (Texas Instruments Argentina S.A.I.C.F.)
Brazil — São Paulo (Texas Instruments Eletronicos do Brazil Ltda.)
Canada — Richmond Hill (Geophysical Service Incorporated) **England** — Bedford (Texas Instruments Limited)
France — Paris (Texas Instruments France) **Italy** — Milano (Texas Instruments Italia, S.p.A.)
Japan — Osaka (Texas Instruments Asia Ltd.) **South Australia** — Elizabeth (Texas Instruments Australia Ltd.)
Sweden — Lidingo (Texas Instruments Sweden A.B.) **Switzerland** — Geneva
The Netherlands — Almelo (Texas Instruments Holland N.V.)
West Germany — Munich, Gronau, Stuttgart, Hanover (Texas Instruments Deutschland G.m.b.H.)

TEXAS INSTRUMENTS
INCORPORATED
SEMICONDUCTOR-COMPONENTS DIVISION
P. O. BOX 5012 • DALLAS 22, TEXAS

SC-7906-865
PRINTED IN U.S.A.